



SATURDAY, OCTOBER 26, 1872.

## Goodwin's Improvement in Dumping-Cars.

The designs for dumping-cars which we illustrate herewith has been the subject of a patent, and is the invention of Mr. John M. Goodwin, who thus describes his invention in his specifications:

Figure 1 represents a half transverse section, fig. 2 an end view, fig. 3 a half longitudinal section and fig. 4 a side elevation.

Dumping-cars are now in use in which the floors sustaining the load are inclined, either from the sides toward the middle of the car or from the middle toward the sides of the car, and in which the load is, upon the opening of certain valves, discharged by the action of gravity, either through openings or traps, entirely in the middle of the car or outward from the sides and half upon each side of the car. Other dumping-cars are in use in which the floor sustaining the load is inclined from one side entirely across the car, and in which the load is discharged by the force of gravity at the side of the car and all upon one side; and still other cars are now used that, when in process of loading, and while in motion, carry their floors in a horizontal position, but discharge their load upon either side of the car by tipping or careening the body of the car to one side or the other by means of rockers or radial arms upon which it rests.

The car above mentioned in which the floor is inclined from one side entirely across the car to the other side is, in some cases, made to discharge its load upon either side of the track or roadway, as desired, by rotating the body of the car upon a pivot or turn-table fixed in or upon its lower frame, thus presenting the inclination of the floor either to the one side or to the other side of the road or track; or, if desired, either before or behind the car.

Fig. 3.

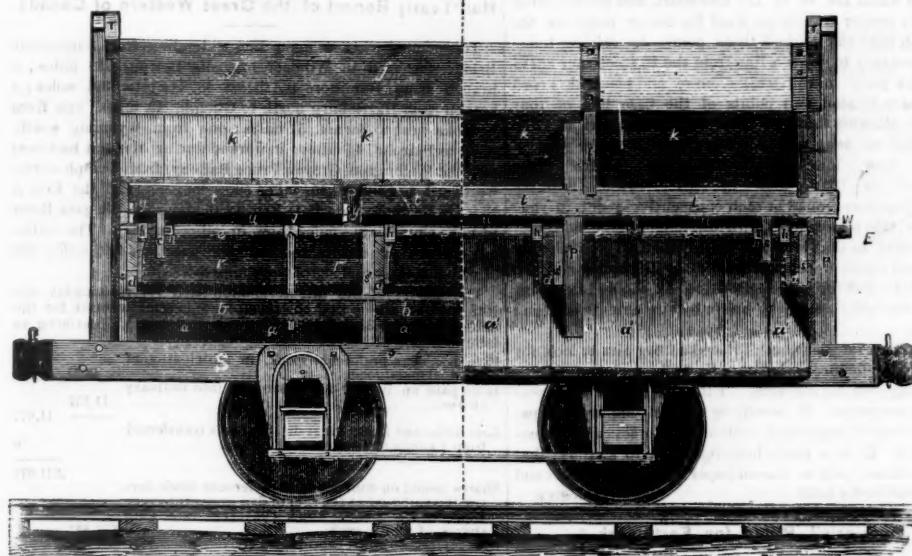
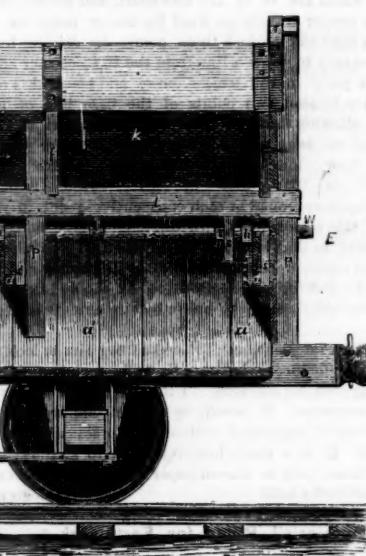


Fig. 4.



DUMPING CAR, BY J. M. GOODWIN.

In the transportation of gravel, sand, coal, ores, grain, and other articles that may be carried and unloaded in bulk, I have found it very necessary to provide a car which, first, shall discharge its entire load upon either side by the action of gravity and without any rotating, rocking, or careening, or any necessary movement of the body of the car; and which shall, second, be so constructed that its valves, when dropped in order to discharge a load or otherwise, shall in no way interfere with the running gear of the car, nor with the passage of the car along the road or track on which it may be used; and so that in case of an accidental dropping of either of the valves, or of both of them at the same time while the car is loaded and in motion, no part of the valves nor of the car-body will be, by reason of such accidental displacement, any more liable to contact with the running-gear of the car, nor with the road or track, nor with objects upon or beside the road or track, than while in position to retain a load, and so that the load of the car in case of such accidental dropping of a valve, as well as when the load is intentionally dumped, shall be thrown upon the side of the track or roadway, entirely clear of said track and out of the way of any car passing along said track; and in constructing a car the valves of which, when dropped or in position to discharge a load, "shall in no way interfere with the running-gear of the car nor with the passage of the car along the track," as specified in the foregoing paragraph, I have in view the advantage to be derived from being free from the necessity for closing the valves of the car immediately after "unloading" and before moving the car from the place of unloading, as well as the advantage of immunity from damage in case of accidental dropping of valves, as above described.

The construction and operation of the car I describe as follows: Upon two sills, *S*, *S*, figs. 1 and 3, which are attached in the usual manner to the running-gear of the car, are placed triangular trusses, *s*, *s*, figs. 1 and 4, the lower parts of the floors resting upon the sills aforesaid, and extending over and beyond the same. Lying in semicircular sockets in the apex of each of the triangular trusses, before specified, is a rod of iron, *e*, fig. 3, cylindrical in cross-section, that extends throughout the length of the car-body, and projects beyond the body at one of its ends, *E*, fig. 4. Upon the projecting end of this rod is formed a square head, *W*, figs. 1 and 4, so that it may be conveniently seized and turned by a suitable wrench or lever. This rod forms a pivot for hinges, *h*, fig. 1, and *h*, *h*, *h*, *h*, fig. 3, that are attached to the cleats, *c*, *c*, and *d*, *d*, figs. 1 and 3, of the valves of the car, which valves are composed of said cleats and their attached floors, *u*, *u*, figs. 3 and 4, and *r*, fig. 4. Keyed upon the said

arms up against the under side of the valve to be closed, and by a continued pressure on the wrench-lever, the valve is raised to its place, to be secured by a manipulation (before reverse described) of the lever *z*.

The manner of constructing the car-body may be modified by making the valves of greater or less width; or by hanging them by hinges attached to the lower edges of the upper floors *n* and *k*, at the same time extending inward the floors resting on the triangular trusses, in order to cover the space occupied by the valve on the side *L* and the space left vacant by the raised valve on the side *R*, and giving these extended floors a curved surface so as to fit the sweep of the swinging valves. These modifications would not affect the relation of the valves and floors to each other, nor change the general direction and manner of discharge of the load.

It is obvious that when the valve is dropped to the position for discharging a load, as shown on the side *L* of fig. 1, no part of the valve itself, nor of the car-body, is any more liable to contact with the track upon which the car runs, nor with any object upon or beside the track, than when the valve is in the position for retaining a load, as shown on the side *R* of fig. 2. It is also obvious that the load discharged would fall outside of the track, and sufficiently far from it to clear any car passing on the said track.

Mr. Goodwin writes to us this further description:

The car is shown as 8ft. 3in. in extreme height, from the top of rail to top of end cross beam of car, and 9ft. 7in. over all in width. The projection of floor beyond rail is 1ft. 11in.

I have shown the car purposely at a disadvantage as regards height—that is to say, I have put 33in. wheels under it, and have made the pitch of the floor steeper than necessary for anything but the softest coal. The side boards, *j*, could be reduced in depth, and still the car would hold as much, even of the lightest coal, as is usually carried on four wheels.

When cars are loaded at shutes, or by steam-shovels, the height of the top rail of the car above the track does not affect the cost of loading.

By covering the joint between the valve and the upper floor with a flap of leather, tacked upon the edge of the upper floor, and putting a roof over the car, with a hatch therein, grain may be carried, the unloading of which would be done with absolutely no expense for hand work.

The weight of the car, with 33in. wheels, would be about 7,000 lbs. Its capacity, even full, would be 238 cubic feet, or 8.81 cubic yards. Its length over drawheads 15ft. 6in. Its wheel base 5ft. 6in., or, if desired to make car six inches longer (thereby increasing capacity 10 cubic feet), six feet.

In estimating the cost I should provide for bearings at least 7 inches long, and for A. French's best extra-tempered freight-springs, 39in. or 32in., 5,000 lbs. capacity, and for wheels and axles of good quality; and believe that even with extra good materials and workmanship, and prices to correspond, the car

can be finished for less, per ton capacity, than the dumping cars in common use.

It is not necessary to mount the car to dump it. A man with a light hand-bar of iron about three feet long will, while standing on the ground, place the point of his bar under the lever *z*, and, using the corner-post of the car as a fulcrum, raise the said lever out of its engagement with the catch, *z*; whereupon the car is dumped. If it is desired to divide the load as above specified two men must simultaneously operate the two levers. After the car is dumped nothing need be done toward closing the valves until arrival at the point for reloading. Then, by a single movement of the radial arms, actuated by a lever 4ft. 3in. long provided for the purpose, the valve on either side is closed. Spring catches may be used to hold the valves in place to carry a load, but I prefer the arrangement shown in the drawing.

## Contributions.

## PRACTICAL FIELD ENGINEERING.

## No. IX.

## CULVERTS.

The proper construction of culverts has received too little attention from engineers in charge of railroad work, and the consequence has been not only great damage to the roadway and rolling stock, but large injury to land-owners along the line, by the overflow of water on their premises by embankments acting as dams to wet-weather drains. It is the object of this paper to offer to young engineers such practical rules and suggestions as will give them a thorough knowledge of:

- 1st. The purpose for which culverts are built.
- 2d. The kinds of culverts generally in use.
- 3d. How to construct culverts.

Thorough drainage is of the greatest importance to secure the permanency of the earthwork of railroads. Neither the roadway in cuttings nor on embankments will be durable if constant

Fig. 1.

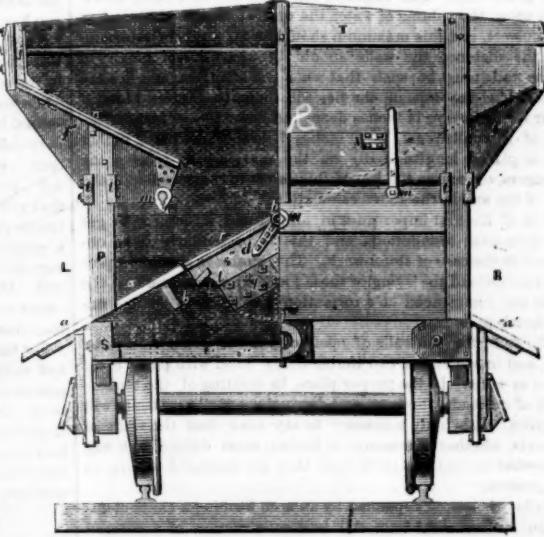
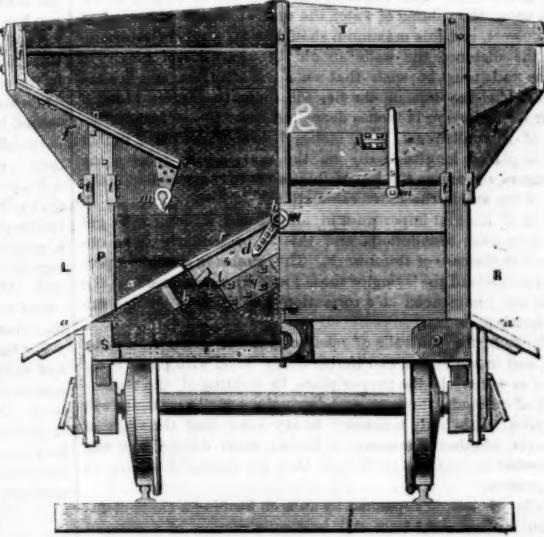


Fig. 2.



dry or for any great length of time it be subject to the action of water. Ballasting is simply labor and material thrown away where, on account of the infiltration of water, the roadway is kept in a soft, yielding state, allowing the gravel or broken stone to settle into the earth. One of the methods by which a considerable part of the drainage of railroads is effected is the erection, at proper points, of culverts, which are simply channels formed for the passage of water across the line of the earthwork, most frequently through embankments.

The damage done to lands through which a line of railroad runs is frequently a large item to be taken into consideration in calculating the first cost of the road, and since this depends greatly for its actual proportions as an element of expense on the care and judgment used in the proper construction of the earthwork, it devolves in a great measure on the engineer to lessen these damages as much as possible, if indeed the entire responsibility is not upon him. One fruitful source of damages is the damming up, by embankments, of the natural channel of surface drainage, causing, especially in rainy seasons, the inundation of considerable tracts of land, to the great injury of grain crops, meadows and pastures. To avoid this, culverts should be constructed so as to give a clear channel through the earthwork for all surface water, as well as for all small spring-streams and ditch currents. If the engineer has had much experience, and has, from the commencement of his labors on any particular line, done his duty well, his field-books and working profiles will show every point where a culvert should be made; but if at any time an oversight has been made in this particular, he must hasten to rectify it. If in going over the line to take the levels for cross-sections, or for any other purpose after final location, you see that a culvert will be needed at any point not hitherto marked, make a note of it and at your earliest opportunity designate it on your working profiles. It is a good thing for the field engineer never to be without a copy of his working profile in his pocket, so that he may at once make any correction suggested by close observation on the field. The conformation of the ground surface, the appearance of the channel, if there be any, and the nature and extent of the water-shed will inform the judgment of the observant engineer as to the dimensions of the culvert for any particular place.

It often happens that by a little expense the water of several small drains may be turned so as to make one culvert serve for all, and this should be done wherever economy or the nature of the road formation will admit of it. If you have not had sufficient experience to judge of this from a simple examination, it is generally the work of but a few minutes to take such levels as will satisfy you, and in any case the level is more accurate than your eye. It is quite frequently the case that borrow-pits, by a little care, may be made to serve the purpose of joining two or more of these small drains and turning the water through a culvert with little or no additional expense. The engineer should be always on the alert to make these little strokes of economy, by which he kills for his employer "two birds with one stone," remembering that "to get the worth of a dollar" is quite as great an object with railroad builders as it is with any other persons, corporate or individual, and that his advancement in his profession mainly depends upon his ability to combine good work with economy. It may not be amiss to say just here that *practical engineers* are in great demand. What a practical engineer is it seems hard for many persons to find out. It has been a habit of critics to set, as if in contrast, *educated engineers* against *practical ones*. What I would call a practical man is one who knows how to make his knowledge of the details of his profession *avail* on the field and in the office, no matter *how* this knowledge has been obtained. If he has broad and accurate knowledge—and can bring it intelligently to bear—I do not ask him whether or not he has been to the schools.

Culverts are of two kinds, open and covered. Open culverts are generally used where the volume of water to pass through them is considerable, unless, in the case of a high embankment, an arched tunnel of masonry is considered preferable.

The best open culvert consists of two walls of good stone set at right angles to the line of the road and sufficiently apart to allow an easy passage to the water it is intended to receive, without at any time rising to within less than two feet of the grade line. The engineer can in most cases easily ascertain about the volume of water the wettest season will bring to his culvert, and this maximum should be his guide in determining the distance the walls should be apart. The height of these walls must be such that when the stringers and ties are superadded the tops of the ties will be up to grade. Thus, if your stringers are 14 inches deep and your ties 6 inches, the top of the walls must be 20 inches below grade. If a timber cap is placed longitudinally on the masonry to receive the stringers, of course the top of this cap is to be considered the top of the wall in the above calculation.

It is of the first importance in all railroad structures to get for them solid foundations, and this is particularly to be observed in the case of stone-work. The engineer should in person superintend the laying of these foundations and see that the walls are commenced on a formation not liable to change under heavy pressure.

The stone for the walls of open culverts is often not to be had, and in such cases two timber bents faced with plank must serve as walls. In the proper place, in treating of the timber-work of railroads, the form and dimensions of these bents will be given. It is only necessary to say here that the walls of culverts, whether of masonry or timber, must extend each way somewhat beyond the earthwork they are intended to support and protect.

Walls of masonry spanned by an arch forming a channel under an embankment form the best construction of a covered culvert, and should always be used, if possible, where the embankment is very high. Care should be used to make the channel amply large; otherwise in times of great freshets the water will accumulate and overflow the earthwork, doing it great damage, if it does not entirely destroy it. I have seen high embankments cut in two by the action of water in a few hours, where if the culvert had been a third larger, great trouble, delay and expense would have been avoided.

Where the amount of water to be passed is inconsiderable, a tile drain will be found sufficient and very economical. If the embankment is low, and the tiling not to be had, a very good covered culvert is made of three pieces of timber, two of which form the sides of the drain, the third forming the cap or covering. This rude sort of culvert should never be used where it will cause great labor and expense to remove it when the timbers rot. In such cases it is better to leave the embankment open and put in a trestle.

But no matter what kind of culvert it is thought most expedient to use in any particular case, it is the duty of the engineer to have each one constructed in a neat and durable way. Nothing can give a more poverty-stricken and unthrifty appearance to a railroad than slouched, botched, rickety culverts; and carelessness in this matter is a fruitful source of accidents, loss of life and the smashing up of rolling stock.

Never leave the setting-out of culverts to boss carpenters nor boss masons. Do it yourself, and do it with care and precision. Culverts should be set out at right angles with the line of the road. Their walls should be parallel.

In the paper on trestles the best methods of setting out timber work will be given. In our next the proper form and dimensions of cattle-guards will be discussed. In the meantime, shoulder your level, call your rodman and go down along the line of your work.

HOOSIER.

#### Some Questions Answered.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The questions of "T." in the GAZETTE of October 12, are of themselves convincing evidence of one of three things, viz.: that "T." is disposed to be funny quizzical, or that he is not a practical engineer, or that he wants to know something.

Let me answer his first question. He asks: "Will 'Hoosier' give us a method, ignoring formulae, for changing curves, when the point of intersection of tangents being inaccessible,

we assume a point at which to commence our curve, run it around, and find it does not join our final tangent? Also the same for reversed and compound curves?"

Well, "T.," I make my inimitable bow, give you a knowing wink and proceed to business.

In the first place, the juncture of tangents is not at all necessary in any case. I have seen engineers (?) who, for the sake of "applying a formula," would sit down in the full glare of an August sun on an open field and "figure" for two hours rather than join tangents where the apex was no more than four hundred feet away. Possibly "T." is an engineer of that sort.

Another kind of engineer is full of assumptions. He as nearly as possible *assumes* everything. Now if there is anything an engineer should never simply *assume*, it is the point of curve on location, unless he desires to fritter away time and receive high wages therefor.

It is a very simple matter, by construction, when the respective bearings of your two tangents are known, to calculate or rather measure the distance to the point of intersection from any given point on the tangent; but the simplest method of solving the problem of T. without the use of formulae is to "thumb the curve in," thus:

Assume your P. C., run your curve in with the transit by the common method, and if you have failed to *guess* correctly and your curve falls within—that is, fails to reach—your second tangent, measure the distance between a tangent to the curve run in and the true tangent on a line parallel to the tangent at P. C., then carry your transit back to P. C., and from this point measure forward on the tangent a distance equal to the parallel distance above mentioned for the proper P. C. If your first curve falls outside of the tangent, measure back for the P. C.

The second question of "T." is certainly the result of a "glance and jump." How do you get your "long back-sights" after you have left your P. C.? You have no fixed line. You must establish your tangent, just as you do your cord, with the transit. For instance, you have run in a curve for a trestle the bents of which are to be 12 feet apart, and consequently you have, by proper deflections, fixed the center point for the base of each bent and marked these points by driving hubs. Now you have only to draw a line from the P. C. of your curve to the second point in the trestle curve and bisect this cord when you have located two points of the base line of your second bent, allowing that your first bent is set out at P. C. perpendicular to tangent. Any practical engineer will at once see how much less liable to involve error my method is than that of "T.," which requires that you set up your transit at each consecutive point in your trestle curve, take a back-sight, turn into tangent and then erect a perpendicular to that tangent. In my method you already have two *fixed points* of your cord, viz.: the beginning and the end. All that is left for you to do is to fix the middle point either with the transit and tape-line or by stretching a cord and bisecting it.

For the further information "T." seeks I beg him to look for and examine the forthcoming appendix to the series of papers now appearing over my signature. I thank "T." for his questions; they are proper. It is only by diligent inquiry and patient comparison of suggested methods that practical information is gained. It is a truth, however, hard to swallow, that many methods are quite as fine on paper as they are useless and unmanageable in the field.

HOOSIER.

#### "Hoosier's" Rules for Earthwork.

ATCHISON, Kansas, October 13, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

For some ten weeks past I have, from time to time, read in the RAILROAD GAZETTE contributions headed "Practical Field Engineering," written by "Hoosier" for the benefit of "young engineers."

As the GAZETTE is read by railroad engineers in all parts of the country, to let pass unnoticed the crudities and errors put forth in those contributions would, in some measure, be a tacit endorsement of them by the profession.

In his last paper—"Estimating Earthwork"—"Hoosier" tells the "young engineer" that to find the solidity of a prismoid he must add together the two end areas and four times the middle area and multiply by one-sixth of the length.

The "young engineer" must be very young indeed if he has not seen this rule in print a good many times before now. But here follows something that is now, doubtless, published for the first time. "Hoosier" says, "To find the area of any cross-section, the following rule is sufficiently accurate:

"Add together the side-cuttings (or side-filings, as the case may be) and multiply the sum by half the breadth of the roadway, and set aside the product. Then multiply the product of the side-cuttings (or side-filings) by the ratio of the side slopes to unity, and add the result to the product already set aside. Result will be cross-sectional area."

In this "rule," "Hoosier" totally disregards the center cut or fill—an indispensable element in the calculation—and it, therefore, utterly fails as a "rule" for finding cross-sectional areas.

But, to test the question practically, let us take the following notes from the field-book of some "young engineer," premising that the width of roadway is twelve feet, slopes one and a half to one, and distance between stations one hundred feet:

Station.	Left.	Center.	Right.	Area by Hoosier's rule.	Area by geometrical rules.
5	f. 2.0	f. 5.0	f. 6.0	66 sq. ft.	84 sq. ft.
6	f. 4.7	f. 9.0	f. 10.4	163.9 "	201.2 "

From the foregoing notes we find the area of the middle section to be . . . . .

The cubic content obtained from those areas by prismoidal formula is:

By "Hoosier's" areas . . . . . 11,198.3 cub. ft.

By geometrical areas . . . . . 15,906.6 "

Error to the credit of Hoosier's rule . . . . . 2,708.3 "

Or 100 cubic yards in one station.

By "Hoosier's" method of *cross average* and *length average*, the cubic contents from the above notes is 13,785 cubic feet; making in the result of his two rules a difference of 2,887 cubic feet, or 95 cubic yards in one station.

It would seem strange, at first sight, that by his *averages* he comes much nearer the true result than he does by his prismoidal formula. It is simply because, in the former he makes use of the center cut or fill, but entirely disregards it in the latter.

"Hoosier's" rule 6, for finding areas, is just about as remarkable for its accuracy as those already noticed. He says: "Add the depth of the cut or fill (the cross average) to half the breadth of the roadway. From the square of this sum subtract the square of half the breadth of the roadway. Result will be cross-sectional area."

In this "rule," he entirely disregards the ratio of side slopes, an element in the calculation quite as indispensable as the depth of fill or width of roadway.

Let us apply this rule in finding the area from the following notes, calling width of roadway twelve feet, and slopes one and a half to one:

Station.	Left.	Center.	Right.	Cross Average.	Area.
8	f. 2.0	f. 7.0	f. 16.0	f. 8.0	100 sq. ft.

By "Hoosier's" rule 6, we make the area from these notes 160 square feet; while the area, geometrically obtained, is 190  $\frac{1}{2}$  square feet.

The rule will apply in the particular case of slopes of one to one, and, even then, is but a very uncertain approximation.

Some other time I shall notice "Hoosier's" method of setting side stakes "from the field-book after the cross-leveling is all done," his practical method of locating railroad curves, setting out trestles on curves, etc., etc.

D. T.

#### Half-Yearly Report of the Great Western of Canada.

This company has a main line extending from Suspension Bridge westward to Windsor, opposite Detroit, 229 miles; a branch from Hamilton northeast to Toronto, 39  $\frac{1}{2}$  miles; a branch from Harrisburg north to Guelph, 19 miles; one from Komoka west to Sarnia, 51 miles; one from Wyoming southward to Petrolia, 4  $\frac{1}{2}$  miles; it worked during the last half-year also the Wellington, Gray & Bruce Railway, from Guelph northwestward to Clifford, 55  $\frac{1}{2}$  miles (now longer); and the Erie & Niagara Railway, from Fort Erie north along the Niagara River to Lake Ontario, 31  $\frac{1}{2}$  miles (now in other hands). The entire mileage worked during the half-year was thus 429  $\frac{1}{2}$  miles, 343 of which is the property of the company.

The report of the directors, submitted on Wednesday, the 16th instant, states that the receipts on capital account for the half-year to the 31st July, 1872, amounted to £13,778 arising as follows:

Five per cent. preference stock, in anticipation of the final instalment . . . . .	£120
Ditto paid up in full for conversion into ordinary shares . . . . .	11,537
Less difference in exchange on 121 shares transferred from Canada to London . . . . .	6
	£11,671
Shares issued on conversion of preference stock during the half-year at the rate of five shares for every £100 stock . . . . .	£86,407
shares of £2 10s each . . . . .	84,300
Less preference stock canceled on conversion . . . . .	2,107
	£13,778

The total receipts on capital account amounted, on the 31st of July, 1872, to £6,573,357. The charges on capital account during the half year amounted to £163,107; of this sum the Engineer's report shows an expenditure for roadway, sidings, station buildings, etc., and a proportion of the cost of steel rails laid in the track, amounting altogether to £18,708; land purchases for station extensions, principally at Detroit, absorb £13,219; car purchases, as stated in the Mechanical Superintendent's report, to the extent of £31,906. For the Guelph loop line £98,880 has been expended, and £746 for small disbursements in respect of the Brantford Branch. The total expenditure to 31st July, 1872, amounted to £6,153,670, leaving a balance of £419,686 at the credit of capital account. The receipts and expenditure on revenue account for the half year have been as follows:

Gross receipts . . . . .	£235,734
Working expenses, including renewals and all charges (50 per cent.) . . . . .	329,496
	£31,298
Fr. in which is deducted—	
Interest on bonds, etc. . . . .	£37,827
Discount and charges on conversion of American currency . . . . .	34,703
Amount set aside for renewal of ferry steamers . . . . .	3,000
Loss on working the Erie & Niagara Railway . . . . .	534
Alteration of gauge account—proportion charged this half year . . . . .	9,100
	£4,184

Add profit on working Galt & Guelph Railway . . . . . 1,725

Add surplus from last half year . . . . . 5,613

Amount available for dividend . . . . . £14,482

The dividend for the half year on the 5 per cent. preference stock amounts to £7,020, and from the balance the directors recommend a dividend on the ordinary shares at the rate of 6  $\frac{1}{2}$  per cent. per annum, payable in London on the 26th of October, which will absorb £135,976, leaving £1,485 to be carried forward to the next half year. The aggregate revenue receipts (exclusive of those of the Galt & Guelph, the Wellington, Grey & Bruce, and the Erie & Niagara railways) exhibit a gross increase of £91,821, which consists of:

Increase in way-passenger traffic . . . . .	£18,896
Increase in through-passenger traffic . . . . .	30,147
Increase in way-freight and live stock traffic . . . . .	19,723
Increase in through-freight and live-stock traffic . . . . .	36,233
Increase in mail and express freight . . . . .	1,68

Total . . . . . £91,821

The net revenue would have shown a larger increase had not the rates and fares continued low—indeed a little less than in the corresponding period. The through live-stock traffic has been carried at so diminished a rate as compared with the half

year ending July 31, 1871, as to cause a decrease in the net earnings of the company from this source of the sum of £34,000. It is satisfactory to observe that the receipts for local or way traffic amount to 40 per cent. of the total earnings. The receipts and ordinary working expenses per train mile for seven corresponding half years compare as follows in sterling:—

Half year ending	Gross earnings per train mile.	Working expenses per train mile.
31st July, 1866.	9s. 10d.	4s. 9d.
" 1867.	8s. 10d.	4s. 24d.
" 1868.	8s. 1d.	4s. 83d.
" 1869.	8s. 0d.	4s. 8d.
" 1870.	7s. 8d.	4s. 7d.
" 1871.	7s. 9d.	4s. 5d.
" 1872.	7s. 9d.	4s. 6d.

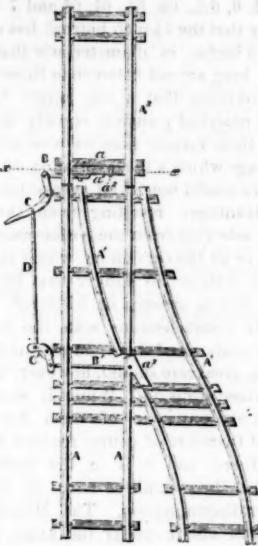
The higher rate of wages and the advance in the prices of many descriptions of stores have adversely affected the working expenses during the past half year. The discount and charges on the conversion of American currency for the half year amounted to £34,702, as compared with £20,730 in the corresponding half year. The comparatively larger loss by exchange arises both from the higher rate and from increased earnings in American currency, and from the conversion into gold of the balance brought over from last half year, together with the entire amount of greenbacks collected, so that no unconverted balance is now carried over. The new car ferry steamer transit, to replace the old boat now broken up, is completed and in use. The cost of it—£14,707—has been provided out of the renewal fund for ferry steamers, and a balance of £15,509 still remains at the credit of that fund. The same half-yearly amount as heretofore—£9,100—has been charged to revenue toward defraying the cost of alteration of gauge. The only remaining portion of the line where the broad 5ft. 6in. gauge is retained is the 76 miles between London and Hamilton. The expense of maintaining the extra rail and the inconvenience of working the mixed gauge have determined the directors to remove and dispose of the third or outer line of rails. The entire system of the Great Western will then be the uniform gauge of the United States—viz., 4ft. 8½in. In conformity with the principle stated in the last report, a fixed rate per mile run has been charged for repairs and renewals of locomotives and cars, whether expended or not. This charge has exceeded the actual expenditure in the past half-year, and there stands at the credit of a suspense account for reconstruction and renewal of cars, on July 31, 1872, a sum of £16,687. The condition of the permanent way and rolling stock is reported to be highly satisfactory by the President and Vice-President, who have recently returned from a personal inspection of the railway. The full advantage of the durability of steel rails has not yet been felt, but it will be seen by a table given in the Engineer's report that during the past half-year the cost of maintenance and renewals, estimated upon the basis of the train mileage, is less than the average expenditure for the last six years, although since 1867 the freight tonnage carried has increased nearly threefold. It may be observed that the gross earnings upon the main line during the past half-year have amounted to the sum of \$10,403 per mile of open railway, being the largest earnings of any single-track railway. The directors are led to conclude that the maximum amount of traffic which can be safely carried on a single line of rails, even with extended sidings, has now been reached. The increasing demands of the through business will tax the resources of the company to the utmost in the coming year; but with the belief to be afforded by the Glencoe Loop Line, the increased sidings between Glencoe and Windsor, the new car ferry-boat, and the augmented equipment of rolling stock, the directors have no doubt that the traffic will be successfully conducted. The Engineer states in his report that the Glencoe Loop Line is fast approaching completion, and it is satisfactory to find that the works will be finished for an outlay within the estimate originally framed. The directors have negotiated an arrangement with the board of the Grand Trunk Railway Company in respect of the International Bridge and its approaches, now under construction, on the principle of accepting half the liabilities of the bridge construction, bridge capital, cost and maintenance—that is joint ownership and management, with equal divisions of earnings from other sources. The agreement will be laid before the shareholders for their approval. An agreement will also be submitted to lease the London & Port Stanley Railway for a period of 21 years, at an annual rental of \$20,000. This line is 27 miles in length, and, running north and south, connects the western extremity of the Glencoe loop line at St. Thomas with the main line at London. By the control of this short line, the rolling-stock on the loop line can be repaired at the London workshops, and the company will obtain at Port Stanley the most convenient access to the coal-fields of Ohio. The arrangement sanctioned by the shareholders at the last meeting, for the purchase at the price of \$25,000 of the Erie & Niagara Railway, has been frustrated, owing to difficulties between the parties who claimed to be owners of this short line of 31½ miles. The object of this acquisition was to obtain a junction at the eastern end of the main line with the Glencoe loop line. This intention can be equally well accomplished by the use of the Welland Railway; the board, therefore, propose to enter into an agreement with the directors of the Welland Railway to use, for a term of 21 years, a distance of 15 miles of it, between the points where it intersects the main line at St. Catherine's and the loop line. An agreement to secure running powers over the Hamilton & Lake Erie Railway will also be submitted to the meeting. This road is in course of construction, and will run from the city of Hamilton to Port Dover on Lake Erie. This agreement is made in conjunction with other railway companies, and is based upon the equitable principle of payment according to the tonnage carried over it by each company. The Engineer's report gives the progress of the test or drainage tunnel under the Detroit River. When this is completed the practicability of constructing the railway tunnel will be demonstrated. It is proposed to provide the capital for this purpose by the issue of bonds on the joint guarantee of the Great Western and the Michigan Central railways, the tolls on traffic passing through the tunnel being applied to pay interest on the bonds, and provide a sinking fund for their redemption. An agreement to carry this out will be laid before the shareholders. The Wellington, Grey & Bruce railway has been worked from Guelph to Clifford, 55½ miles, during the half-year, and thus far the expectation formed of its value has been realized. During the past half-year it has been worked within 70 per cent. of its gross earnings, and has yielded additional earnings to the Great Western, from interchange of traffic, to the extent of \$46,422.86, and in the two years since the first short section of it was opened, of \$144,785.38. Since the termination of the half-year further sections, to Walkerton and to Paisley, 29 miles beyond Clifford, have been partially worked, and in a few weeks it is expected the entire line will be completed to Southampton, on Lake Huron. The receipts and expenditure of the Detroit & Milwaukee railroad have been as follows for the half-year ending June 30, 1872: Gross earnings, £134,215; working expenses, taxes, &c., £99,463; balance to meet interest on bonds, £34,752. The through traffic of this road is increasing, but the local traffic has decreased owing to the new lines of railway crossing it at Grand Haven, Grand Rapids, Ionia and Holly. It is hoped that the gradually increasing population of the northern peninsula of the State of Michigan will compensate for this diversion of traffic. On the other hand, the Great Western is benefited by the additional country opened up by these new railways. Since the last general meeting Mr. M. K. Jesup, of New York, has resigned his seat at the board, and the directors have the satisfaction of stating that Mr. John Cleghorn, one of the directors of the North Eastern Railway, has been unanimously elected to fill the vacancy.

#### New Railroad Patents.

##### IMPROVEMENT IN RAILWAY SWITCHES.

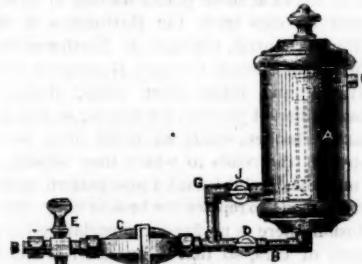
Messrs. John and Robert Hollen, of Allegheny, Pa., have patented an improvement in railroad switches, of which they give the following description in their specifications:

"This invention relates to an improvement in railroad switches, which is particularly designed for dispensing with the 'frog' ordinarily made use of in the switching of cars from one track to another; and it consists of the use with the rails of two intersecting railroad tracks of a movable section of track and a movable rail having an arm fastened thereto at an acute angle with itself, the said parts being operated in any suitable manner, and by means hereinafter described, or otherwise.



"In the accompanying engraving,  $A$   $A'$  refer to two intersecting railroad tracks. The section  $A^2$  of the straight track  $A$  is susceptible of lateral movement at that end thereof which abuts against the said track  $A$ , and slides back and forth upon its tie  $a$ , while its rails are also connected and held together by means of a tie,  $a'$ , which is guided and permitted to slide within a staple or between the tie  $a$  and a bar of metal,  $a^2$ , with its upper portion overhanging the tie  $a'$ . A stop is placed at a point opposite and within such a distance of each end of the sliding tie  $a'$  as to limit its movement, whereby the movable track  $A^2$  will be prevented from being thrown out of line with the two intersecting tracks  $A$   $A'$  as it is switched from one to the other. The end of one of the rails of that part of the track  $A$  which intersects with the track  $A^2$  is constructed with an arm,  $a^3$ , located at an acute angle thereto, or in such a manner as that, when the movable end of the section  $A^2$  of the track  $A$  is moved in a line with the curvilinear track  $A^1$ , it will be in a line with the rail of the latter, which intersects the straight track, thus dispensing with the 'frog' ordinarily used for the connecting of the two tracks at this juncture. \* \* \* The end of the rail carrying the arm  $a^3$  is susceptible of lateral movement, whereby the same can be shifted from one rail to another.  $B$   $B'$  refer to two rods, the former being attached to the tie  $a^1$  of the movable section  $A^2$  of the straight track, and the latter to the movable rail with the arm  $a^3$ . The outer ends of these rods are attached one to a lever,  $C$ , and the other to a curved pivoted arm,  $C'$ , which lever and arm are connected together by a rod,  $D$ . This lever, when operated, will perform the office of switching the rails one from the other."

##### IMPROVED LUBRICATOR.



Mr. Elijah McCoy, of Ypsilanti, Michigan, is the patentee of this invention, which he describes as follows:

" $A$  represents the vessel in which the oil is contained, and from the bottom of which pipe,  $B$ , leads to the steam-chest. This pipe is, at a suitable point, provided with a globe or reservoir,  $C$ . Between the vessel  $A$  and the globe or reservoir  $C$  is a stop-cock,  $D$ , in the pipe  $B$ , and in the same pipe, between the globe and the steam-chest, is another stop-cock,  $E$ . A steam-pipe,  $G$ , passes from the dome or boiler down through the vessel  $A$  and connects with the oil-pipe  $B$  at the globe or reservoir  $C$ , or at any point between the same and the valve  $D$ . In the steam-pipe  $G$ , after it leaves the vessel  $A$ , is a stop-cock,  $J$ . One of these oilers is to be placed on each side of the smoke-arch directly opposite the cylinders, and the various stop-cocks should be so connected with the levers or rods that they can be operated simultaneously by a single rod in the engineer's cab. When the engine is working the stop-cocks  $E$  and  $J$  are closed and the stop-cock,  $D$ , opened, allowing the oil to pass into the globe or reservoir,  $C$ . The steam being in the pipe  $G$  prevents the oil from congealing in cold weather in the vessel  $A$ . When the cylinder is to be oiled, the stop-cocks,  $E$  and  $J$ , are opened and  $D$  closed. Steam passing from the boiler or dome through the pipe,  $G$ , forces the oil out of the globe or reservoir,  $C$ , into the cylinder."

We feel disposed to inquire how the oil in the reservoir,  $C$ , is to be prevented from congealing.

##### IMPROVED CUT-OFF VALVE.

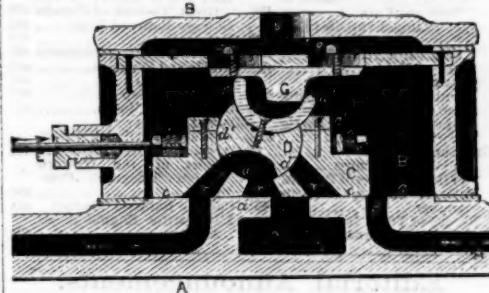
The nature and object of this invention is thus described by the inventor:

"It consists primarily in the combination, with a three-port slide-valve, of an automatic cut-off of peculiar construction, which holds the steam until the piston is near the end of its stroke, and then releases the same as live steam is admitted at the opposite end. There is but one valve-rod, the cut-off being carried by the main valve and actuated by the contact of a tap-

pet-stud. This tap is adjustable, in order that the action of the cut-off at the respective ends of the stroke may be equalized or varied, as required."

The main valve  $C$  is a three-port slide, with  $x$ ,  $x'$ ,  $x''$ , corresponding with those in the valve seat, and connected with a cylindrical or segmental recess,  $d$ ,  $d'$ ,  $d''$ , which receives an oscillating cut-off valve,  $D$ , with a cavity,  $d$ , which connects the valve ports with each other and two surfaces,  $d$ ,  $d''$ , to close them as required. The face of the main valve,  $C$ , is likewise provided, in addition to its ports, with projections,  $e$ ,  $e'$ , to cover the cylinder ports,  $s$ ,  $s''$ , during certain portions of the stroke.

An ordinary single valve-rod,  $E$ , is attached to the main valve,  $C$ , a longitudinal bar,  $F$ , supporting a tap-pet-stud,  $G$ , is ar-



ranged at the top of the steam-chest, and a bracket,  $H$ , to the top of the cut-off valve to "actuate" the latter as the main valve moves to and fro. The operation is sufficiently obvious from the engraving without further description.

#### Rupture of Cylindrical Boilers.

Mr. Thomas W. Bakewell, of Pittsburgh, has contributed to the *Scientific American* the following:

I have occasionally addressed to you, and to various scientific institutions, communications relative to the prevailing error of estimating that the steam force required to rupture a cylindrical boiler is as the pressure on the diameter, instead of on the semi circumference, the error involving the dangerous under estimate of 57 per cent. From several of my correspondents I have received favorable replies; and the firm, so extensively known in scientific engineering, of Fairbairn & Co., of Manchester, England, have sent me the following letter:

"MANCHESTER, August 28, 1872.

"TO THOMAS BAKEWELL, Pittsburgh:

"Dear Sir—I think you are perfectly correct in your views that the force to rupture a cylindrical boiler is not as the diameter, but as the semi-circumference of the circle. The general opinion, however, is that the force is as the pressure on the diameter, and I think this was first promulgated by one of your own distinguished professors, W. R. Johnston, of the Franklin Institute. Your diagram and illustration gives a clear demonstration of the formula, by the result contained in your paper. I am at present engaged, by request of the Royal Society and the British Association, on experimental inquiries into the powers of resistance of rivets to the shearing force, being of important interest in the construction of boilers and iron-shipbuilding, and shall have much pleasure in sending you a copy of the results. Very respectfully and truly yours,

"W. FAIRBAIRN."

[The theory attributed to Professor Johnston had been previously stated by Oliver Evans.]

Waiving the advantage for explanation, by references to the diagram, I subjoin a part of my paper to Messrs. Fairbairn, namely:

Let the diameter be 1, the half circle 1.57, and the steam force 1 lb. per inch; then, in the resolution of the radial force's into horizontal and vertical, a steam pressure of .637 lbs. will be the mean horizontal pressure on the half circle; or  $1.57 \times .637 = 1$ , the diameter, so far agreeing with the current error. But in the resolution of the vertical forces thus obtained, we have a mean horizontal force from them of .363 lbs. steam pressure on the half circle, or  $.363 \times 1.57 = .57$ , in addition to the former horizontal pressure of .637 lbs. Recapitulation: By resolution of the radial forces,  $.637 \times 1.57 = 1$ ; by resolution of the vertical as independent forces,  $.363 \times 1.57 = .57$ ; total horizontal force to part the circle at top and bottom, 1.57, those points being selected for investigation.

The steam pressure of .637 lb. (say .63662) is the mean of the cosines, and that of .363 lbs. (say .36338) the mean of the complement of the cosines.

#### Report of the Western Union Telegraph Company.

The following is an abstract of the annual report of this company for the year ending June 30, 1872, rendered at the annual meeting October 9:

On the 30th of June, 1872, the company operated 62,032 miles of line with 137,199 miles of wire. All this is operated through 5237 offices. The increase during the year past was 6,000 miles of line, 16,039 miles of wire, and 631 offices. To perform the labor required for such vast operations the company has in its employ 8,347 operators, who last year transmitted 12,444,499 messages, being an increase of 1,788,422 over the year preceding. The gross receipts for the year were \$8,457,095.77, the expenses \$5,666,863.16, leaving a net profit of \$2,790,232.61, which is an increase over the last year of \$619,646.92 in the gross receipts, \$562,075.97 in the expenses, and \$237,570.95 in the net profit. During the past year the company has introduced one of the most important inventions for the transmission of messages which has been made since the telegraph first went into operation. This is the duplex telegraph, invented by J. B. Stearns, by means of which messages can be transmitted in opposite directions on a single wire at the same time. It has come into very general use, and has afforded vastly increased facilities for telegraphing. The present Western Union system dates from the consolidation of the United States, the Southwestern and the American companies in 1866, and the net profits during that six years ending June 30, 1872, amount to \$17,116,694.23. Of this sum \$4,826,879.34 was disbursed for interest on the company's bonds. The balance, \$10,361,412.91, was expended in the construction of new lines, the erection of additional wires, and the purchase of telegraph property.

—A California correspondent writes: "We have had an elopement by rail here, where a young couple of Sacramento actually had the benefit of a special train to elope in, the lover being railroad man."



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#### Editorial Announcements.

**Correspondence.**—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

**Inventions.**—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

**Articles.**—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

#### INTERCHANGEABleness.

The importance of adopting standard forms and sizes for the different parts of railroad machinery has become so apparent, and of late the attention of railroad managers has been called to it so much, that organized efforts are being made to establish some standard for those parts whose diversity has caused most trouble. The inconveniences which result from a want of uniformity in such matters as the threads of screws is seldom realized by those who manage the finances of railroads, and the incessant annoyance which results from the effort of screwing nuts with ten threads to an inch on bolts with twelve, or vice versa, few can realize so well as those who have handled a monkey-wrench and wounded their knuckles and injured their tempers in the daily attempt to make twelve go into ten. The Master Mechanics' Association took the first step in this direction by recommending what is known as the United States or Franklin Institute standard system of screw threads for all locomotive work. The Car Builders' Association followed by recommending the same system for cars, and at the same meeting recommended 2ft. 9in. as the standard height from the top of rails to center of car draw-heads; and the same Association has now a committee at work who have under consideration the adoption of a standard form and size for car axles and axle boxes and bearings. For the sake of the object which is aimed at, we trust that neither the committee nor the Association by which they were appointed will be too hasty in their conclusion, nor come to any decision without very mature and careful consideration of the whole subject. It must always be remembered that although it is very desirable that railroad practice should crystallize into standard forms, yet this should never be forced prematurely; because just so soon as a standard is fixed, then improvement must stop, and so long as experience has not very clearly determined what proportions are best, it will probably be wiser to withhold any exercise of authority which would arrest the process of development. It is of course impossible, so long as men are not infallibly wise, to determine what size and form would be absolutely the best for a car axle, for example; but all engineers and experienced mechanics recognize

that condition of experimental development, in which it becomes apparent from even very diverse practice that none of the existing forms or sizes of parts are of any very great importance, and that they might just as well be one as another, the advantage of uniformity being very much greater than that of any of the merely incidental shapes or dimensions. As an example, we have before us a table giving the dimensions of the car-axes used on sixty-five different roads. The journals of these axes are of the following diameters: 3, 3 $\frac{1}{2}$ , 3 $\frac{3}{4}$ , 3 $\frac{5}{8}$ , 3 $\frac{3}{4}$  and 3 $\frac{1}{2}$  inches. Their length 5, 5 $\frac{1}{2}$ , 5 $\frac{1}{4}$ , 5 $\frac{1}{2}$ , 5 $\frac{1}{4}$ , 6, 6 $\frac{1}{2}$ , 6 $\frac{1}{4}$ , 6 $\frac{1}{2}$  and 7 inches. Now we do not say that the 3 $\frac{1}{2}$ -inch journal has no advantages over the one 3 inches in diameter, nor that those which are 7 inches long are not better than those which are 5; but it is very obvious that a size might be established which would practically answer equally well in all the places where these various sizes are now used. The very slight advantage which a little variation of these dimensions will give would not at all compensate for the immense disadvantages resulting from their diversity. Therefore, in selecting from these dimensions a standard best adapted to all the cars under which these axles are used, there is little or no danger that improvement in this direction will be arrested or hindered to an extent at all or nearly commensurate with the evil caused by the existing variations of sizes. In selecting any of them for a standard, great care should, however, be exercised to come to the wisest decision. While it would be better to have almost any one of them for a standard than none, yet there are of course reasons for preferring some over others, and it is in the exercise of such a discretion that the committee have an opportunity of showing their discrimination. The Master Mechanics' Association will also consider the same subject at its next annual meeting, and should it decide upon one form as the best, and the car-builders fix another standard, it would of course create a great deal of confusion; and probably, for the present at least, defeat the object which they both now have in view. Should the two Associations fail to co-operate in this matter, or make serious mistakes in recommending a standard, it would of course weaken their authority in this, as well as future attempts in the same direction.

If railroad companies realized the profit which would accrue from the adoption of the best patterns for the different parts of cars, engines and permanent way, they would find it to their interest to supply their officers and the committees with every requisite means, facilities and authority to give the subject a thorough investigation. The advantages which would result from the use of standard car trucks it is impossible to estimate, because there are so few data from which to calculate. That the present diversity is immensely expensive is obvious at any of the distributing points for cars, such as Albany, Harrisburg, Jersey City, Pittsburgh, etc. It is not a figure of speech to say that miles of cars are often to be found at these places waiting to be repaired. There will be cars from the Burlington & Missouri River, Illinois Central, Chicago & Northwestern, Lake Shore, Michigan Central, Chicago, Burlington & Quincy, Pennsylvania and many other roads, almost all of which have different patterns for trucks, so that if a casting or axle is broken, either an order must be sent to the shops of the roads to which they belong, or else the car must be detained until a new pattern and casting or forging is made to replace the broken one. To add to the confusion, there is no fixed nomenclature for the different parts of cars, so that if an order is sent for any piece there are a number of chances that one different from what is needed will be sent. At nearly all the principal repair stations along our through lines, perfect museums of brass bearings and other castings must now be kept on hand. Numberless mistakes must, of course, constantly occur, delays innumerable are caused thereby, and an enormous expense is constantly incurred because, thus far, there has been no co-operation among the men who direct the design and construction of railroad machinery.

Besides the direct advantage of greater convenience and facility in making repairs, there would be many which, although incidental, are of quite as much or greater importance. A manufacturer of axles, at the present time, when business is dull, and his forge and men without work, is afraid to manufacture a large stock in anticipation of future orders, because if he makes them with 5 $\frac{1}{2}$ in. journals, the parties who may want to buy in future may use axles with 6, 6 $\frac{1}{2}$  or 7in. journals. There is no certainty, therefore, that his stock, if he manufactures one, will be salable in future; and, therefore, when the demand springs up railroad companies must inevitably pay higher prices for axles because there is no stock on hand to fill orders. There is thus a loss all around: the railroad company loses by being obliged to pay a higher price; the manufacturer loses by having his forge idle part of the time; and his men lose

by being unemployed when there are no orders. Of course the same thing is true of all other parts of rolling stock.

In another way, too, an advantage will accrue. So soon as a standard is established for use on all roads, it becomes possible for private manufacturing firms to make the different parts as articles of merchandise. Take draw-heads for cars: these can now be bought from manufacturers in Pittsburgh and elsewhere at lower prices than any railroad companies are making them for. Their price would inevitably be still further reduced if these manufacturers could in dull seasons make a stock which they would be certain to sell in future. The reasons for the reduction in the cost of production in private establishments, as compared with the expense of manufacture in the shops of a corporation, is well understood by those who have studied the question. Men in charge of their own works and expending their own money handle it more carefully and exercise more energy and vigilance than it is possible for a corporation to secure in officers or employees. Besides the attention of a manufacturer is concentrated on his own article. He watches the market, and buys material where and when it is sold cheapest; he devises economical methods and processes of doing work. If he is wise he cultivates a sort of loyal allegiance in his workmen towards himself, which leads them to work with cheerfulness and alacrity. Where manufacturing is carried on a large scale improved machinery is also used to a much greater extent than corporations can usually be induced to use it; and, more than all, manufacturers have the prospect of gain to stimulate them to cheap production.

It is also probable that, just as soon as established standards are adopted for railroad machinery, not only will the rough forgings and castings be made and sold by private manufacturers, but they will be finished complete and ready for use. With the system of gauges now in use in the best machine shops, it is possible to make all parts of machinery exact duplicates of each other, so that the price of car-axes, locomotive-links and pistons may be quoted as regularly as bar iron or hollow ware.

Of course, in deciding upon standards, the highest mechanical skill should be exercised; and only after the most careful investigation and after giving due weight to existing practice, experience and precedents should any decision be made; and, more than all, those who have this work in charge should eliminate all personal prejudice or individual predilection in fixing upon standard forms and patterns for general adoption.

#### The Delusiveness of Patents.

A regular reader of the *Official Gazette* of the Patent Office cannot help but be impressed with the inutility of a very large proportion of the patents which are issued weekly. In many cases it is obvious that the inventions described will not practically accomplish the purpose for which they were made; in others the object aimed at is of very little value; and in still more the patent itself would, if tested, afford no protection to the inventor.

To illustrate what we refer to, we will take the oil-cup which is the invention of a Mr. McCoy, and is described on another page. His claim is for

"The combination of the vessel A, oil-pipe B with reservoir C and stop-cocks D E, and the steam-pipe G with the stop-cock J, all constructed and arranged substantially as and for the purposes herein set forth."

The purposes set forth are the liquefaction of the oil and the application of steam to force it into the steam-chest. The claim, it will be seen, in which resides the virtue of his patent, is simply for the special arrangements which he has adopted for accomplishing this result. Now there have been from a dozen to a hundred or more devices for accomplishing exactly the same thing, and we do not believe we exaggerate in saying that any ingenious mechanic could devise fifty more for accomplishing the same result in quite as effectual a way, none of which would infringe on the above claim. What possible hope can there be, therefore, that this patent can be of any value, unless for the purpose of deluding some one by it, and thus realizing profit from its sale, which we do not believe was the object of the inventor in patenting it. The truth is, that the hope of realizing large profits out of the sale of patents becomes a mania with a class of people who either lack mental balance for looking at things in a common sense way, or who have only very superficial notions of the manner in which the anticipated profits are to accrue to them from a patent. There is also another class who, without doubt, are *non compos mentis* on this subject—people to whom patents are as alluring as gambling is to others, and in whom the fascination of mechanical invention produces most of the ill effects of any other game of chance.

Many of the professional solicitors of patents do all in their power to stimulate this illusion, by quoting the immense success of lucky and doubtless intelligent

inventors, whose heads—to use a Western phrase—"are level."

Now we do not intend to decry the principles of patent law. We believe they are founded on strict justice, and that some people will at times avail themselves of their advantages. The difficulty is, that a very large proportion of the people who take out patents do so without knowing themselves what are the advantages which they expect to gain. They have vague notions that a great deal of money is sometimes made by the sale of patented inventions, and hastily conclude that if they patent their inventions, they, too, will make money. They therefore pay a good fee to an agent, who gets a patent for his client in which is claimed "the combination" of *A, B* and *C*, with some of the other letters of the alphabet, and upon which the inventor builds his hopes, wastes his exertions and reaps disappointment.

It seems as though a little reflection must induce these people to see how remote is the prospect of realizing any profit out of a patent of this sort. There are but three ways that we know of by which a patent can be made profitable; one by selling the right to use or manufacture; the second by giving a monopoly and excluding competition from a branch of manufacturing or trade; the third by inducing people to supply money to "introduce" or "develop" an invention, and then pocketing as much of the money thus advanced as is practicable, and yet keep out of the State prison.

Of the first method it must be remembered that there is little money, excepting perhaps a doctor's or dentist's bill, which people pay so unwillingly as that for the right to do what without your patent they could do as much as they liked. If, therefore, there is any way by which they can do what they want to without infringing on your claim, they will be very sure to find it out. In this way the people from whom the profit must be realized become the active assailants of the rights conferred by your patent. The second method is useful only to those engaged in manufacturing or trade, and therefore seldom available to working mechanics and mere schemers, who are the most frequent victims to the lunacy of invention. Of the last way of making patents valuable we need not speak here, as it would require a discussion of some of the principles of criminal law to treat it properly.

Before spending any time or money on a patent, it will be well for an inventor to consider whether, in case his claim is granted, it is at all probable that any one can be induced to pay him for the right to use or manufacture; or, if he is in business, whether his patent will be a protection to him and thus give him any advantages in his business in excluding competition; or lastly, whether the inventor is willing to delude and defraud others in order to enrich himself.

A little experience in the sale of patents would, we believe, in most cases effectually dispel all hope of revenue from the sale of rights to use or manufacture, which is the chief hope of profit to two-thirds of the inventors who have their faces turned toward Washington. If the elated hopes and bitter disappointments which lie buried under the archives in the patent office could be exposed to view, they would be an exhibition of unhappiness and misery which it would be hard to realize and impossible to describe.

One of the worst features of the case is, that those least able to bear the loss of time and money are usually the victims of patent hallucination. Laborers, mechanics and dreamers, whose only reliance for subsistence is their own work, will dream and scheme, waste time and money, squander hope until it changes to despair, and impoverish themselves and those dependent upon them, and all because they will not exercise a little common sense, but listen to those whose business it is to gild the picture as bright as possible to deceive their victims and profit by their disappointments.

#### Railroad Earnings in September.

We give below the reports of earnings of twenty-two railroads for the month of September, with the increase in mileage, where any exists, and a statement of the earnings per mile for the two years. This list includes all the lines that report regularly, we believe, with the exception of the Union Pacific, which is usually about a month late with its reports. The Des Moines Valley makes its appearance for the first time. In connection with an arrangement with the second-mortgage bondholders the company made a report of its earnings for the current fiscal year.

We find by examining the previous table that we have with a total increase of 84 per cent. in mileage an increase of 54 per cent. in gross earnings; and the earnings per mile have fallen from \$876 to \$856, a decrease of about 24 per cent. Compared with the other months, the earnings are large—at the rate of more than \$10,000 per mile per year. The most notable instances of increase per mile are the Atlantic & Great West-

ern, 224 per cent.; Central Pacific, 164; Lake Shore & Michigan Southern, 9 per cent.; Indianapolis, Bloomington & Western, 24 per cent.; Marietta & Cincinnati, 154 per cent.; Missouri, Kansas & Texas, 62 per cent.; Ohio & Mississippi, 11 per cent.; St. Louis & Iron Mountain, 164 per cent.

On the other hand, among those showing a decrease in earnings per mile are the Atlantic & Pacific, 184 per cent.; Burlington, Cedar Rapids & Minnesota, 27 per cent.; Chicago & Alton, 224 per cent.; Cleveland, Columbus, Cincinnati & Indianapolis, 93 per cent.; Illinois Central, 144 per cent.; Milwaukee & St. Paul, 94 per cent.; Pacific of Missouri, 344 per cent.

As usual, the very large increases in earnings per mile are chiefly on roads whose traffic is still very light, and for the most part new roads. The large decreases are mostly on roads of larger traffic. The true basis of comparison is, of course, the earnings per mile, but with this there are frequently many things to be considered. New branches and extensions cannot reasonably be expected to be equally productive with old ones, and the opening of a large amount of new line, however desirable, is always likely to bring down the average receipts per mile of a road which heretofore has worked only old road with traffic fully developed. In not a few cases, however, new mileage in 1872 is balanced by new mileage in 1871.

The proportion of the roads reporting is so small that these earnings are not so valuable as they might be as an indication of the prosperity of the railroads and of the country. Complete returns from the four or five hundred companies which operate railroads would be of exceedingly great value, especially as indicating the effect of new lines on traffic.

#### RAILROAD EARNINGS FOR SEPTEMBER.

NAME OF ROAD.	Mileage.	Earnings.		Increase.	Decrease.	Earnings.	Per cent.	1872.	1871.
		1872.	1871.						
Atlantic & Great Western.	539	\$406	\$33	612		\$496,366	3034	\$634	\$764
Atlantic & Pacific.	310	116	534	97,366	112,739	115,360	133%	194	434
Burlington, Cedar Rapids & Minnesota.	162	113	61	113,894	95,612	116,911	19%	1,143	983
Central Pacific.	1,166	1,013	153	1,832,228	945,921	230,340	22%	224	268
Chicago & Alton.	650	511	139	419,062	61,617	61,617	8354	124	958
Cleveland, Cinc. & Indianapolis.	470	390	81	419,459	98,981	94,156	82%	835	835
Des Moines Valley.	240	949	15	156	683,989	1,139	152%	1,694	1,694
Erie.	971	926	15	156	1,618,464	1,194,357	150,833	150,833	150,833
Illinois Central.	1,109	1,019	106	739,967	739,967	10,154	24,046	130,340	94
Indiana, Bloomington & Western.	212	212	116	124,208	124,208	368,328	26,360	586	586
Kansas Pacific.	672	673	1,038	58	341,968	1,067,946	416,941	3,384	548
Lake Shore & Michigan Southern.	1,966	1,966	1,018	103	61	815,945	1,067,941	1,449	1,319
Marquette & Cincinnati.	1,121	284	284	1,034	811,901	160,791	22,604	724	724
Missouri, Kansas & Texas.	572	476	96	204	191,811	191,811	95	670	670
Ohio & Mississippi.	389	389	116	824	356,232	302,070	96,320	820	820
Pacific, of Missouri.	471	355	355	355	317,410	364,128	46,716	152	152
St. Louis, Alton & Terre Haute.	296	296	346	346	177,449	185,432	11,013	667	667
St. Louis, Alton & Iron Mountain.	246	210	38	18	194,000	141,165	54,835	37,729	37,729
St. Louis, Kansas City & Northern.	583	583	628	388	388,384	387,697	7,313	451	451
Toledo, Wabash & Western.	628	628	237	10	434	385,811	6,994	482	482
Total Increase.	11,946	11,963	958	854	1,227	104,544	9,756	544	544
Total.						\$10,189,032	\$10,719,079	\$656	\$656

#### Record of Track Increase.

Under the head of "Old and New Roads," there was published in the RAILROAD GAZETTE of last week accounts of the completion of track on new railroads as follows:

*Davenport*, extended from Hopkinton northward to a point 2½ miles north of Delaware Center, Iowa, a distance of 14 miles. *Northern Pacific*, extended 45 miles to a point 130 miles west of Red River. *Oregon Central*, extended from the Tualatin River southward 10 miles to Gaston, Yamhill County, Oregon. *Saginaw & St. Louis*, track laid from Cheanang westward 7 miles to Swan Creek, Mich. *Houston & Central*, extended from Dallas northward 15 miles. *Monroe* (narrow-gauge), extended northward 5 miles to a point 10 miles north of Tunkhannock, Pa.

This is a total of 96 miles of new railroad.

The current number has information of the following new construction:

*St. Louis & Iron Mountain—Arkansas Branch*, completed by the extension of the track 9 miles south of Nealy's Swamp to the Arkansas line. *Bridgeton & Port Norris*, extended from Newport east to Mauritstown, N. J., 7 miles. *Ashland, Youngstown & Pittsburgh*, extended from Bloomfield southward to Champion, Ohio, 13 miles. *Green Bay & Lake Pepin*, extended westward 5 miles to Amherst, Wis. (70 miles from Green Bay). *Bennington & Glastonbury*, completed from Bennington northeastward 9 miles to Glastonbury, Vt. *Port Royal*, track laid from Augusta southeastward to the Savannah River Bridge, 4 miles. *Mount Alto*, completed from the Cumberland Valley Railroad, 2½ miles east of Chambersburg, southward 13 miles. *Wilmington & Western*, extended from Cuba Hill, Del., west to Landenberg, Pa., 9 miles. *Philadelphia, Wilmington & Baltimore*, new loop line opened from Gray's Ferry (two miles from Philadelphia) southwest 12 miles to a junction with the old line near Chester.

This is a total of 81 miles of new railroad.

**VICORIA**, the most populous though much the smallest of the Australian colonies, has been considering the subject of a standard gauge for its future railroads. It has a considerable mileage now, the gauge of all of them being 5 feet 3 inches. The English railroads were adopted as a model of construction, and however they may have failed to reach the solidity and excellence of English railroads, they have approached them in their excessive cost, which, we think, has been something like three times as great as that of the average American railroad. It being evident that lines so costly could not pay in a new country where the traffic is for some time light, there was an earnest inquiry for something cheaper. The advocates of the narrow gauge were on hand as usual, and put forth their marvelous statements profusely and pressed with energy the adoption of their ideas at the time fairly carrying the press and securing a popular pressure which, about a year ago, caused the colonial Assembly to pass a law fixing the gauge of new lines at 3 ft. 6 in., in opposition to the Engineer-in-Chief, Mr. Higginbotham, who had studied the systems of various countries, and was decidedly in favor of the standard gauge, with light construction and the adoption of many of the peculiarities of American railroads which have enabled us in this country to make profitable lines where the traffic is quite thin and the country not half occupied. The colonial Council, which seems to be a sort of upper house, whose assent is required for some measures and not for others, after hearing the evidence of engineers and others, refused to pass the "construction bill" without a clause requiring the assent of both houses of the Legislature to any change from the old gauge. The Assembly disagreeing, the matter went over to the next session, and in the meantime the opinions of eminent engineers in various parts of the world were collected, which supported the position of the Engineer-in-Chief. The matter coming up for discussion at a recent session, the Assembly reversed its former action, and voted against a change of gauge by a majority of 42 to 10. The new lines will consequently be made with the 3 ft. 6 in. gauge, the standard gauge of the colony; and we venture to say that they can be made and worked with that gauge very nearly or quite as cheap as with the 3 ft. 6 in. gauge, will be capable of greater speed with safety, while they can easily and cheaply and without delay be changed into heavy railroads with capacity equal to any.

**CINCINNATI** for some time has been discussing the feasibility of obtaining its coal supply by rail. The nearest mines are something like 150 miles distant, and are or will be reached by three or four lines of railroad, there being accessible supplies in Ohio, Kentucky, Indiana and West Virginia, as well as in Pennsylvania, whence the chief part of the supply comes now. The distance does not seem a formidable one for carrying coal, and one might be surprised that the railroads are not fully equipped for a large traffic in this staple, for which there is a large and increasing demand in Cincinnati, with its numerous manufactories, if it were not for the Ohio River, which, when navigable, affords transportation almost from the mouths of the mines to the city landings at rates with which the railroads can hardly compete. It is true that the river is frozen up a large part of the year and dried up another part, and that not infrequently, during extended periods of low water, the price of coal rises to such a point that transportation by rail could be effected profitably. But no company will provide an equipment merely to meet emergencies which for two-thirds of the year would be laid up with nothing to do, or employed unprofitably. Thus the very advantage which Cincinnati has in the river tends to prevent a cheap and regular supply of coal by rail.

It is even not impossible that on the average the city might be quite as cheaply provided with coal by rail as it is by the river, if the railroads had the entire coal traffic. The very cheap transportation on some of the anthracite roads is possible only because they have an enormous and regular traffic—at least as regular as the coal production. But with high water comes a fleet of barges from Pittsburgh carrying almost a month's supply of coal, and at a trifling cost for transportation. These, doubtless, will always compete with the railroads, and will always carry a very large share of the coal consumed at Ohio River towns, and they not only limit the rates on the railroads, but the amount they will carry.

**RAILROAD SUBSIDIES IN MINNESOTA** are declared legal by a decision of the Supreme Court of that State, rendered a few days ago. The case was one in which the city of St. Paul gave its bonds to the amount of \$200,000 to the *Lake Superior & Mississippi Railroad Company*, "as a bonus to insure the speedy resumption of work and the building of their railroad from St. Paul in the direction of Lake Superior." After the issue of the

bonds, provision was made for collecting taxes to pay the interest, and suit was brought by citizens to restrain the collection of this tax, as levied for an unlawful purpose. As the Legislature had authorized the subsidy by a special act, the plea was that the Legislature exceeded its powers under the constitution in passing such an act, and that a tax could not be imposed for the construction of a railroad which was the property of a private corporation. In short, it was the general question over again: Is the construction of a railroad a "public purpose" such as will justify the levying of taxes? The lower court decided that it is not, and this decision the Supreme Court has just reversed. It based its interpretation chiefly upon general usage, but argued in favor of the correctness of the common interpretation, saying that "the public has an interest in such a road when it belongs to a corporation as clearly as they would if it were free, or, as if the tolls were payable to the State, because travel and transportation are cheapened by it to a degree far exceeding all the tolls and charges of every kind, and this advantage the public has over and above those of rapidity, comfort, convenience, increase of trade, opening of markets, and other means of rewarding labor and promoting wealth," etc.

In this decision Minnesota follows most of the other Western States, the famous Michigan decision having been followed, we believe, in no other State, though several States have since established direct constitutional prohibitions of railroad subsidies.

THE BROTHERHOOD OF LOCOMOTIVE ENGINEERS has been holding its ninth annual convention in St. Louis. The organization now has 156 divisions, with a membership of more than 8,000. It publishes a monthly journal in Cleveland, which has a circulation of twelve thousand copies, and the receipts of which form the chief income of the central organization. The annual address of Mr. Charles Wilson, the "Grand Chief Engineer," lays great stress on the efficiency of the Brotherhood in elevating the character of engineers and their standard of excellence. Mr. Wilson deprecates strikes, and believes that men of the character and ability required as qualifications for membership in the Brotherhood will always be in demand at satisfactory wages. He reports that the Brotherhood has met with consideration and liberal treatment on the part of railroad officers and others. He recommends that total abstinence be required as a qualification for membership in the Brotherhood; says that members now complain of long hours and overwork, caused frequently by the practice of running freight trains at a slower rate of speed than formerly, without diminishing the length of a day's run. He also complains of Sunday work, and advises a united effort to secure the abolition of the practice of running trains on Sunday as far as possible. The finances of the Brotherhood are in an excellent condition, the income of the year having been about \$19,500, the expenditure \$13,600, and there remaining in the treasury about \$31,500, about \$25,000 being last year's surplus.

The convention adopted the advice of its chairman in regard to Sunday labor and adopted a resolution favoring its disuse.

ENGLISH RAILROADS, having to pay enormously higher prices for coal and iron, and considerably higher wages than ever before, have, not unnaturally, raised their rates. The iron-masters of Middlesborough, whose business of course is very much affected by the rates for transporting ore, coal and manufactured iron, protested against this increase and held a public meeting. At this some interesting statements were made, one being that one establishment pays near a million dollars yearly to the Northeastern Railway Company, and another that a rail-maker offered the company for its old rails more than it had given him for them when they were new! The freighters resolved that it was desirable to form an association for their mutual protection in the matter of rates and fares, and there was talk of organizing a new railroad company. The fact being that the iron men and coal men, who are the chief shippers by the Northeastern, are now making enormous profits, the railroad company doubtless feels that it should share in the general prosperity, and not simply hold its own.

THE GREAT WESTERN RAILWAY OF CANADA has published its report for the first half-year of 1872, an abstract of which we publish elsewhere. The progress made is very satisfactory, there being an increase of nearly one-fifth in receipts, which on the main line were at the rate of more than \$10,000 per mile for the half-year. The proportion of expenses to earnings has increased slightly, being 59.82 per cent. this year against 58.46 per cent. in 1871. The receipts from all branches of traffic have increased, that from passengers being 22½ per cent., and that from freight nearly 19 per cent. The road, indeed, has now nearly all the traffic it can carry over a single track; but the new Canada Air Line will give it two lines for most of its length, which can be made to work together. Meanwhile the road is in admirable condition; large additions have been and are being made to its equipment; the Air Line is progressing favorably towards Buffalo, and the local as well as the through traffic grows handsomely.

THE CAMBRIA IRON WORKS, which lost its rolling mill by fire on Saturday, October 12, had it in operation again the following Wednesday! In fact, the damage was greatly exaggerated in the telegram, and was but \$40,000 instead of \$400,000. The workmen immediately devoted themselves to the erection of sheds, tools were forwarded from Philadelphia and elsewhere, and, the heavy machinery not having been disabled, everything was in order for work in short order.

THE PRICE OF IRON, at least in England, seems to have reached its maximum, and our English exchanges of the 5th note that during the previous week there had been a notable tendency to lower prices, extending in the case of bars of cer-

tain manufacturers to two pounds per ton—more than 10 per cent. We find prices of American rails quoted at \$82½ and \$85, which were lately firm at \$90. The advance has been so great as seriously to disturb all calculations for new railroads and expenses of working and maintenance; and as hitherto there seemed little prospect of any limit to the advance, the news of a halt which is likely to be permanent, even without a recession, will be welcomed by buyers and contractors.

TASMANIA (better known as Van Dieman's Land) has one railroad, and this was recently abandoned by the proprietors through inability to make working expenses. We believe there have been very few such instances in the history of railroads, and it indicates that the road is where there is either scarcely any demand for transportation, or other means of carriage exist over which the railroad does not have much advantage.

#### Chicago Railroad Viaducts.

At a recent meeting of the Railroad Committee of the Chicago Common Council, Mr. J. M. Walker, President, and Mr. Robert Harris, Superintendent of the Chicago, Burlington & Quincy Railroad, and Mr. John Newell, President of the Illinois Central Railroad Company, were present and took part in a discussion of the interference of street and railroad traffic on the line of the former road across the South Division. The following report of the meeting is from the *Chicago Tribune*:

The first thing taken up was in relation to viaducts and the use of horse power on Sixteenth street. Mr. Woodman asked Mr. Walker, of the Chicago, Burlington & Quincy road, what he would like to do on behalf of his road.

That gentleman said that so far as using horse power was concerned, the railroads could not afford it. If they could, business people and the community could not afford it. It was impracticable—it could not be done and do the business. If the roads took all the streets and all the day they could not do it even now. Generally a car took four horses. They could not get horses enough to move the cars of the passenger trains alone. Five hundred freight cars were also passing. The railroads were more important to the city than anything else. They must do their business promptly. Goods and passengers must not be delayed. There were suburban towns whose people must get in and leave promptly, and not spend an hour and a half in going to the city limits. The road ran six special suburban trains, and they must be given up if they went to horse-power. Nor did he think the passage of the streets of so much consequence. It was dangerous, but the delay was not much to complain of. But for the roads there would have been no Chicago, and a thousand delays were better than no roads. His associates had brought a hundred million to build their road, and the result was the city. Would they now destroy that traffic? They had better increase the facilities, and offer inducements for people to come here. No man present had been delayed over three minutes at any crossing. There was a thousand times more delay at the bridges. They could not have a railroad system without evils, but would they therefore give up roads? The road came in many years ago. We got the right of way through what was then an open field. All who came to live here after then knew the road was there for all time by legislative enactment.

Mr. Tuley stated the grant across the city was to the Illinois Central.

Mr. Walker thought if one road had the grant all had, in reply to the Mayor, he did not represent the right of the Council to pass the order relative to horse power.

Ald. Clark said the people would be satisfied if the Indiana avenue engine house were removed, the coal and lime tracks were taken up, lumber cars not brought over to the South Side, and freight trains not made up there. If the road would do that they would waive the viaduct question for the time.

Mr. Walker did not intend to argue the powers of the Council. He wanted to point out the impolicy of such an ordinance. If passed, they should build from Aurora to Joliet and pass by Chicago. They could dispense with the engine house, substantially, by so arranging as to keep the engines off Michigan avenue. Orders had been given to stop letting off steam there so as to frighten horses.

The Mayor complained of whistling.

Mr. Walker said the Legislature required the whistle sounded or a bell rung.

The Mayor preferred the bell. He was wakened from a sound sleep every night.

Mr. Walker said the second point could be satisfactorily arranged. It was their desire to accommodate the people. Trains were limited to twenty cars now. They might be limited to ten, which would not cover more than one street. The point would be considered. As for viaducts, he had not consulted other roads, but the Chicago, Burlington & Quincy and Michigan Central would do all that was necessary on their own lands, the city to build the approach. Viaducts he thought the only thing, and that they were unobjectionable. The track could be lowered eight or nine feet. About sixteen feet and a half were required for a train.

The Mayor suggested that they have special engines, with lower smoke-stacks.

Mr. Walker said the Pullman cars were fourteen feet, and they had brakemen on freight cars. They must have sixteen and a half feet. The approach at the viaducts would hardly be perceptible, and was no disadvantage. It was the purpose of the company, in time, to put viaducts over all their streets.

Mr. Newell, of the Illinois Central, said his company had for years been ready for viaducts. Nearly all the lumber shipped by the Central came from the West Side, and cars had to be sent across the city. They could not get it by the Stock Yard track, for it would take six days, and stop shipments. Owners of lumber yards would like to be consulted about it.

The number of cars in a train might be limited to ten, but it would be an expense, doubling the number of engines and men, and absorbing profits. There were times when a train had to stop, but it would be practicable to so arrange matters as not to block a street. The western lumber trade of the road could be done on the West Side. The road was willing to join in anything to relieve difficulties, but they preferred viaducts, which removed the difficulty for all time. It was not practicable to tunnel the river, since they had to go down thirty-six feet, and they could not drop their grade so much on the South Side, and West Side lumber cars would have to switch back a long distance. If they had viaducts they would have to raise the grade nine feet at Wabash, and ten at State. That sunk the track to one foot above extreme high water in the lake. The roads would pay for the abutments and the superstructure. The sidewalks over the city would have to be built. The Clark street viaduct would have to be four feet higher. The tracks of the Michigan Southern road could be lowered four feet. The removal of the sewers would not aid them. They were governed by high water. So long as the Rock Island was on Clark street they would build no viaduct there. Whether the Northwestern was willing to spend any money on the viaducts he doubted,

but the other roads were three-quarter owners. He agreed with Mr. Walker that viaducts alone could settle the matter. The railroad and city engineers had agreed upon that point. The road was in no hurry to build the viaducts, but was ready to do it when the city said so.

Mr. Harris, of the Chicago, Burlington & Quincy road, said that by making up trains of a few cars they could stop the obstruction of streets. If they could keep cars in motion it was better to have one train of twenty than two of ten. All wanted to have the delay as brief as possible.

Mr. Walker never knew of any team being frightened at the Halsted street viaduct, and Mr. Woodman had seen no such instances at Adams street. Mr. Walker said viaducts were universal in Europe, and did not scare horses. A little siding would remove all trouble.

Mr. Newell said their idea was to make a bridge of iron beams with a Nicolson pavement on that.

Mr. Woodman stated that no member of the committee had thought of requiring horse power.

#### The Fairlie Engine in an Accident.

The following is extracted from a letter to Mr. Fairlie from Mr. Edmund Wragge, C. E., Chief Engineer to the Toronto, Grey & Bruce, and Toronto & Nipissing railways of Canada, 3½ in. gauge, on which two Fairlie engines have been at work some time:

"Thinking you may like to hear how the Fairlie engines sent out to this company and to the Toronto & Nipissing Railway Company are doing, and what satisfaction they are giving, I send you a few particulars. We have been running the engines on both railways now since the beginning of last April, and they have done very well, both as regards the loads they haul and the repairs needed in work. The engines pass round our curves admirably and are very easy on the track: they run so smoothly that our men are apt to run them rather too fast for economical working, but I am trying to put a stop to this."

"The Toronto & Nipissing engine has had a most severe test as regards her strength. Owing to carelessness on the part of the section men a rail was up on a bridge without the flag being far enough away, and the engine ran off, broke through the bridge, and fell down on her side, a depth of about 12 feet, and nearly the whole train piled on the top of her. The only parts damaged were—the cab smashed to atoms, two tanks very badly damaged by bridge timbers running into them, and the slide bars of the upper side engine bent by cars falling on her. None of the parts commonly said to be weak in your engines suffered in the least; the ball and socket joints were as good and light after the accident as before; the centre and radial steel castings remained uninjured, and everything else quite sound and good. I righted the engine where she lay, laid a track under her, and pulled her up a gradient of 1 in 4 with the Fairlie engine of the Toronto, Grey & Bruce Railway without having to jerk at all, merely taking about 6 inches of slack each time, as I kept the engine blocked all the way in case of any accident to the tackle, and only hauled her about 2 feet at a time."

"The only point I want to try now is how these engines behave with a snow-plow, whether the shock in running into a snow bank will affect the center pin or radial casting. I presume they have been used for this purpose in Russia. I have been thinking if I could in any way divide the shock between the truck and the boiler, instead of fixing the snow-plow only on the truck, and take the strain off the connexions. I think I can devise some means of doing this."

"Altogether I am very pleased with these engines, so far as I have seen them working in summer, and if their character is upheld to their winter working, as I expect it will be, I shall be glad to recommend further orders for them. With this view I should be glad if you could send me a photograph of a passenger engine suitable for 3½ in. gauge. My own idea is that four-wheeled trucks should be used for passenger engines, which have never so heavy a load to haul."

#### General Railroad News.

##### CHICAGO RAILROAD NEWS.

###### Chicago, Burlington & Quincy.

The Railroad Committee of the Common Council has been conferring with this company, and is reported to have agreed upon a report recommending that viaducts be constructed over the tracks of this railroad at Clark and State street, Wabash and Michigan avenues, the tracks to be sunk so that the viaducts shall not be more than six feet in the clear above the street grade. This improvement, or some improvement that will do away with the grade crossings on these busy streets, has long been needed, and will be needed more and more, as the traffic of the street and of the railroad increases constantly and rapidly. The grade crossings are a great injury to the traffic of the road, and have especially an unfavorable effect on its suburban traffic. If once all grade crossings in the city could be removed, there would be no limit to the speed with which trains might run for the four or five miles which must be passed but slowly, and may cause considerable irregularities in time, to say nothing of danger. These four crossings are the most frequented ones and most likely to cause delay. The company will be much benefited by a change. It long ago proposed the construction of viaducts and the sinking of the tracks as far as practicable; but there has been, and probably is still, a bitter opposition to the construction of a viaduct on the fashionable avenues, as likely to injure their appearance. We believe that the plans heretofore have contemplated a higher viaduct, however. There are difficulties connected with sinking the track beyond a certain distance which can hardly be overcome.

Another complication is made by the railroad tracks that are crossed on and near Clark street. If the Burlington tracks are sunk, the cross tracks (those of the Lake Shore & Michigan Southern and Chicago, Rock Island & Pacific) must be raised or sunk also; so these companies will have something to say on the subject.

###### The Burlington Consolidation.

A good deal of interest is manifested among the railroad men of this city on the subject of the consolidation of the Chicago, Burlington & Quincy and the Burlington & Missouri River railroads. As the time approaches when the union of the roads will probably take place, the interest grows. The consolidation cannot prove otherwise than beneficial to Chicago, since it will place in the hands of one company another through line of road between it and Omaha, and in the hands of the officers of the Chicago, Burlington & Quincy road its management cannot fail to be satisfactory to the public.

###### Changes in General Offices.

Several of the more important railroad companies of the city will shortly remove to more commodious and permanent quarters. The general offices of the Chicago, Burlington & Quincy Company will soon be removed to the northeast corner of Randolph street and Michigan avenue; the Michigan Central general offices will, within two or three weeks, be again at their old place, near the head of South Water street; the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific general offices will probably not be removed to the great new depot building before about the first of January. The

delays caused by the strikes of workmen have postponed the completion of this building beyond the time when it was originally expected that it could be finished. The walls are all completed, and the greater share of the rafters and trusses which are destined to sustain the roof.

#### Changes of Time.

Nearly all the great trunk lines will adopt their winter time-tables on Monday next, October 28. The time of arrival and departure of trains here will be but little varied from the summer time-tables, the general change being the departure and arrival of trains about half an hour later each day. Trains on the Lake Shore & Michigan Southern will arrive at 9 a. m., instead of 9:30, and depart at 8 a. m., instead of 7:30, as heretofore. On the Michigan Central road the regular express train will leave at 9 a. m., instead of 9:30, and arrive at 8, instead of 8:30.

#### Lake Shore & Michigan Southern.

The business on this road is constantly increasing. The company could use hundreds of extra cars if they could be obtained. The President of the Ohio & Mississippi Railroad Company has been out to Salt Lake City with the directors' car belonging to this company, returning last week.

#### Chicago & Northwestern.

This company is pushing the building of new road in all directions with remarkable energy. The Marquette connection is now in charge of the company directly, the contractor having failed to carry out his contract. The new line from Milwaukee to Fond du Lac is also being pushed forward with great rapidity, and is to be completed by the 15th of December. The Winona & St. Peter Railroad is going forward at the rate of two miles per day, and a spur is in progress from the Galena Division, southward to Batavia, in Illinois. The Madison Extension is hindered by the slow progress of the work on the tunnels, but is proceeding as rapidly as these circumstances will permit.

#### Milwaukee & St. Paul.

An example of unexampled celerity in building is now in progress in this city. A block of ground bounded by Halsted, Union, Wayman and Carroll streets is having the old wooden buildings that have stood upon it for years removed or pulled down, and the foundations are now being put down for a large freight house for the Milwaukee & St. Paul Railroad Company. The building is to be 420 feet in length by 70 in width, and will extend from Union to Halsted streets, having its south front along Wayman street. The foundation is of massive stone, the walls of brick with iron trusses and slate roof. The stone work is all to be completed this week. Messrs. Earnshaw & Gobel are the contractors for this work.

#### New Freight Depot.

The ground bounded by Sangamon, Carroll, Halsted and Kinzie streets is to be cleared of its old buildings preparatory to the construction thereupon of large freight buildings for the Chicago, Danville & Vincennes, the Pittsburgh, Cincinnati & St. Louis, and the Milwaukee & St. Paul railroads. There is some talk, too, of building on the ground a large union passenger depot next season, though the project has not yet assumed definite shape.

#### PERSONAL.

The Baltimore & Ohio Railroad Company has voted to set aside \$5,000 of its 6 per cent. stock for the benefit of the family of Mr. William Prescott Smith, its late Master of Transportation. Friends of Mr. Smith in Baltimore have opened a subscription for a monument to his memory. It was begun at a public meeting with an anonymous subscription of \$1,000, to which \$165 was added in the course of the evening.

Among the elected delegates to the convention which is to make a new constitution for Pennsylvania are Mr. Franklin B. Gowen, President of the Philadelphia & Reading Company; Mr. James Boyd, an attorney for the same company; Mr. William Darlington, for many years one of the counsel for the Pennsylvania Railroad Company; Mr. J. Gillingham Fell, a director of the North Pennsylvania, and other railroad men.

Mr. Charles Baines, for thirteen years Assistant Superintendent of the Detroit & Milwaukee Railroad, has resigned that position.

Mr. D. W. Parker, Superintendent of the Iowa Division of the Illinois Central Railroad, is about to remove his residence from Waterloo, Iowa, to Dubuque.

#### ELECTIONS AND APPOINTMENTS.

Mr. T. J. Conely has been appointed Superintendent of the Detroit, Lansing & Lake Michigan Railroad. Mr. Conely was formerly Superintendent of the Eastern Division of the Michigan Air Line road.

Mr. J. B. Foley has been appointed General Ticket Agent of the Fort Wayne, Jackson & Saginaw Railroad, in place of Robert Riddle, resigned. Mr. Foley has been for some time agent for the company at Jonesville.

Major J. W. Durrow, lately one of the engineers of the Kansas Central road, has been appointed Chief Engineer of the Kansas & Nebraska Railroad. His headquarters will be at Junction City, Kansas.

At the annual meeting of the St. Joseph & Denver City Railroad Company, on October 8, the following board of directors was elected: D. M. Steele, Mr. Joseph, Mo.; E. N. Morris, Hiawatha, Kansas; Charles G. Scraford, Seneca, Kansas; Frank Schmidt, Marysville, Kansas; R. W. Donnell, St. Joseph; H. H. Butterworth, Horace Leland, A. H. Jackson, August Prentiss, Thompson Pinckney, Francis A. Coffin, H. C. Tanner and J. H. Haar, New York. Of these Messrs. Butterworth, Leland, Jackson, Coffin and Haar are new directors, the remaining members of the board re-elected and comprising all the old board with the exception of A. Bestie.

At the annual meeting of the stockholders of the Annapolis & Elk Ridge Railroad Company, held at Annapolis, Md., October 14, the following directors were chosen for the ensuing year: F. L. Bardeu, of New York; Thomas J. Igelhart and Colonel George S. Marsh, of Anne Arundel County; Isaac Solomon, of Solomon's Island, Calvert County; General George H. Steuart, of Baltimore, and John J. Butler, of Annapolis, Md. The State Directors are: Hon. John Thomson Mason, Aug. Gassaway, Esq., and James J. Waddell. This is an entirely new board, no member of the old board being re-elected.

At the annual meeting of the Western Maryland Railroad Company, held at Baltimore, October 16, J. K. Longwell, of Westminster, Md.; G. W. Harris, of Hagerstown, Md.; John Welty, of Smithsburg, Md.; Isaac Motter, of Williamsport, Md., and Joshua Biggs, of Rocky Ridge, Md., were re-elected directors on behalf of the stockholders.

Mr. Thomas F. Withrow, of Des Moines, Iowa, has been appointed General Solicitor of the Chicago, Rock Island & Pacific Railroad Company, and will take up his residence in Chicago.

The officers of the "Locomotive Builders' Association," whose constitution we published last week, are: President, Charles T. Parry, Baldwin Locomotive Works, Philadelphia; First Vice-President, H. G. Brooks, Brooks' Locomotive Works, Dunkirk, N. Y.; Second Vice-President, H. L. Leach, Hinkley &

Williams Locomotive Works, Boston; Secretary and Treasurer, John Cooke, Danforth Locomotive and Machine Company, Paterson, N. J.

Walter H. Barnes, formerly of Worcester, has been appointed to the assistant superintendence of the Boston & Albany Railroad made vacant by the resignation of Abram Firth.

The annual meeting of the stockholders of the Western Union Telegraph Company was held at the office of the company, 145 Broadway, New York, October 9. The number of shares voted on was 273,116, and the following gentlemen were unanimously re-elected as directors for 1872-73: William Orton, James H. Bunker, Horace F. Clark, Alonzo B. Cornell, Harrison Durkee, Augustus W. Greenleaf, Edwin D. Morgan, O. H. Palmer, Augustus Schell, John Stewart, E. B. Wealey, Hugh Allan, Nathan A. Baldwin, William D. Bishop, Ezra Cornell, William E. Dodge, Sheppard Gandy, Norvin Green, John A. Griswold, Wilson G. Hunt, George Jones, C. Livingston, E. S. Sanford, Hiriam Sibley, Z. G. Simmons, Moses Taylor, Daniel Torrance, George Walker, Stillman Witt. At a meeting of the board held October 10, the following officers were chosen for the ensuing year: President, William Orton; Vice-Presidents, A. B. Cornell, O. H. Palmer, Augustus Schell, George H. Mumford.

Thomas D. Lovett, formerly Engineer of the Ohio & Mississippi Railroad, has been tendered the position of Consulting Engineer of the Cincinnati Southern Railroad.

J. F. Witcher has been appointed Traveling Agent of the Atchison & Nebraska Railroad.

W. F. Rector, heretofore Superintendent of the Mississippi Valley & Western Railway, has been made Auditor and Cashier, and J. W. Whipple has been appointed Superintendent in his place.

Mr. William Bliss has been appointed General Manager of the Boston & Albany Railroad. The Boston *Advertiser* says of this appointment: "The duties of the new General Manager of the Boston & Albany Railroad are to be analogous to those which on some other roads fall to the Vice-President, rather than the duties of Superintendent, as at first reported. Mr. C. O. Russell, of Springfield, is to remain the General Superintendent in addition to having charge of the Springfield Division."

#### TRAFFIC AND EARNINGS.

The earnings of the Erie Railway for the week ending October 15 were: 1872, \$410,295; 1871, \$407,004; increase, \$3,291, or 0.7 per cent. The earnings for the 28 weeks from April 1 to October 15 were: 1872, \$10,331,981; 1871, \$10,312,825, increase, \$1,156, or 0.7 per cent.

The earnings of the Great Western Railway of Canada for the week ending September 27 were: 1872, £30,968; 1871, £23,577; increase, £7,391, or 31 per cent.

The earnings of the Grand Trunk Railway for the week ending September 28 were: 1872, £42,100; 1871, £41,100; increase, £1,000, or 2.4 per cent.

The earnings of the Kansas Pacific Railway for the first week in October were: from passengers, \$27,728.15; freight, \$60,709.46; mails, \$2,055.31; total, \$90,492.92. Of this amount, \$2,242.20 was for transportation of troops, mails and government freight.

The earnings of the St. Louis & Southeastern Railway (consolidated) for the first week in October were \$29,100. This is an increase of \$6,792 over the corresponding week in September.

The receipts of wheat at St. Louis, by rail, for the week ending September 21 were: by Missouri Pacific, 3,503 bushels; Atlantic & Pacific, 12,117; St. Louis, Kansas City & Northern, 4,617; St. Louis & Iron Mountain, 8,600; Rockford, Rock Island & St. Louis, 6,470; Toledo, Wabash & Western, 17,510; Chicago & Alton, 10,850; St. Louis, Vandalia, Terre Haute & Indianapolis, 51,153; Ohio & Mississippi, 19,930; St. Louis, Belleville & Southern Illinois, 8,080; St. Louis & Southeastern, 39,994; total, 185,824 bushels. In the same week, 29,304 bushels of wheat were received by boat from the upper Missouri, 22,977 from the lower Missouri, 5,141 from the Missouri and 7,182 from the Illinois River, making in all 64,608 bushels received by river. It is noticeable that less than one-sixth of the entire amount came from the west of the Mississippi by rail.

The earnings of the St. Louis & Southeastern Railway (consolidated) for the second week of October were \$28,100, being an increase of \$6,706 over the same week in September.

On the 10th a train of 23 cars all loaded with tea passed over the Chicago & Northwestern Railway on its way from San Francisco to Chicago.

The earnings of the Atlantic & Pacific Railroad for the month of September were: 1872, \$97,366; 1871, \$112,726; decrease, \$15,360, or 13 per cent.

The earnings of the Pacific Railroad of Missouri for the month of September were: 1872, \$317,410; 1871, \$364,128; decrease, \$46,718, or 12 per cent.

The earnings of the Great Western Railway of Canada for the week ending October 4 were: 1872, £25,088; 1871, £23,559; increase, £1,529, or 6 per cent.

The earnings of the Grand Trunk Railway for the week ending October 5 were: 1872, £41,700; 1871, £38,800; increase, £2,900, or 7 per cent.

The earnings of the Northern Railway of Canada for the ten weeks from July 1 to September 7 were: 1872, £44,789; 1871, £34,834; increase, £9,955, or 28 per cent.

The San Francisco *Bulletin* gives the following statement of the freight shipped from San Francisco to the Atlantic States, per Pacific Railroad, for the first nine months of the year:

Base bullion, lbs.	17,450	Leather, lbs.	905,120
Butter	60,128	Merchandise	7,895
Case goods	77,530	Metal	21,990
Cash	26,670	Peanuts	44,168
Coffee	1,329,270	Quicksilver	80,190
Cotton	918,231	Rags	19,496
Fish	2,105,977	Seal skins	501,248
Flour	4,179,850	Wilk.	688,133
Fruit	14,409	Tea	8,442,961
Furs	2,164	Whalebone	14,311
Glue	82,920	Wine	2,199,458
Hides	27,957	Wool, domestic	12,966,736
Hops	24,076	Wool, Australian	1,648,158
		Total, lbs.	43,793,754

This is a total of something like 2,200 car loads—nearly ten a day.

The earnings of the Erie Railway for the week ending October 7 were: 1872, \$413,183; 1871, \$407,004; increase, \$5,179, or 1.4 per cent. The earnings from April 1 to October 7 were: 1872, \$9,921,686; 1871, \$9,912,821; increase, \$8,863, or 0.7 per cent.

#### MISCELLANEOUS.

It is said that the boys who sell cigars on the cars will have to look out for the new instructions from Washington. It has been decided to allow them to sell only from properly-stamped packages, under a special tax-receipt as dealers. The sales

must also be made exclusively in the smoking-car, and the tax-receipts must state the route over which the dealer travels and the number of the car.

A boy stole a ride on one of the New York & New Haven freight cars in New York, fell off and sustained injuries which caused him to lose his leg. Thereupon the company was sued for \$25,000 damages, it being argued that the company should prevent boys getting upon their cars. The Superior Court dismissed the complaint: boys must pay for their own legs if they lose them while stealing rides.

Eli Hanson has just received \$4,000 at Bangor from the European & North American Railway Company for an assault committed upon him by a brakeman in the employ of the company. Hanson was accompanied by a dog which the brakeman attempted to remove from the car, in accordance with the rules of the road, but was resisted by Hanson, which caused the assault.

There was recently a collision on the Erie Railway by which the engineer and fireman on one of the locomotives were killed. Their widows brought suit for damages, and the plea of negligence is given as follows:

"It was claimed that the accident which caused the death of Chapman and Chassielet occurred through the negligence of the train dispatcher at Buffalo, in telegraphing two trains to pass each other. The telegrapher, it was claimed, was intoxicated at the time, and that the defendant had sufficient notice that his habits were bad. The further question was presented and argued at length as to whether the system of running trains by telegraph, for convenience of business as was shown in this case, is not, in itself, negligence."

The verdict in the first case was, for the plaintiff, \$5,753.47, and in the second case for the plaintiff, \$5,756.49, the trial beginning before the Circuit Court in Buffalo.

#### THE SCRAP HEAP.

##### Refrigerating Passenger Cars.

A Calcutta paper is credited with the following description of a process of cooling cars said to have been adopted on two coaches in which the Viceroys and staff were carried from Calcutta:

"Under the floor of the car there is an air chamber, with ventilators at each end for collecting the air in the direction in which the train proceeds. Above these air chambers there are four layers of khuskhus mats, with spaces for air left between them, through which a current passes into the interior of the car. The 'tatties' are watered by means of a peculiarly-constructed bucket, which is replenished by a small pipe from a tank, which, when once filled, will not be exhausted before six hours. The bucket is so adjusted as to tilt over at intervals of a quarter of an hour, and to discharge its contents into two pipes that run through the center of the car floor. These pipes have long slits cut in them, through which the water is dispersed over shallow perforated tin trays placed over the khuskhus mats, upon which the water falls in the form of rain. Perfect ventilation, which has hitherto always been the stumbling block in similar enterprises, is effected in this case by the windows, which open outward, and are secured at a lateral angle of about 30 deg. The outer heated air, coming in contact with the window, strikes off from it, and, without raising an actual draft, creates a current, which draws out the cool air inside the car by the windows. These windows are so constructed that every alternate window opens in one direction, so that while one set of windows is opened while a train proceeds in one direction, the other set may be used while the train proceeds the other way. In addition to the above arrangements there is a self-acting ventilator in the roof, which is nothing more than a shutter working on a central pivot, which is kept open in the direction in which the train moves. These windows and ventilators entirely exclude the entrance of the external air, and no air is admitted into the interior of the car which does not first pass through the cool air spaces in the flooring, which, being necessarily free from dust, insures comfort and cleanliness in the interior."

##### Uniform Railroad Signals.

Mr. H. Orr writes as follows to the *United States Railroad and Mining Register*:

"The disagreement of systems of signals, for both eye and ear, adopted by the various railroads, is worthy of attention. Some six years ago the Committee on Science and the Arts of the Franklin Institute examined the subject, and sketched a code of signals covering all the exigencies of this important service, and sent a memorial to Congress asking for the proper legislation in the case. Thus far no effective action has resulted, although the need of it increases every day. I copy below from an original document the system suggested by the committee above named:

"Whistle signals: Down brakes, two sounds of whistle. Up brakes, one sound of whistle. To back or slacken speed, three sounds of whistle. For cattle, crossings, curves and stations, one long sound of whistle. To call in flagmen or crew, one long sound of whistle. For employees to go to assistance of train, three long sounds of whistle. Bell signals, the same, except that to start, the bell is not struck but rung."

"Workingmen's signals to train: To stop, both arms are held at right angles with the body. To stop, when any person is making violent motions to train, both arms held at right angles with the body. To start, one arm at right angles with the body.

"Flags: Danger, red; caution, blue; all right, white. Extra train, following, on same schedule, two red flags on engine. Extra train, following, but to keep away from all regular ones, two blue flags on engine. Signal on rear car to enable engineers to see if all cars are coupled, two red flags.

"Lamps: Danger, red; caution, blue; all right, white. Flag station, red. Stop, red. Lamps on rear cars to see if cars are all coupled, two red. Extra train, following on same schedule, two red on engine. Extra train, following on same schedule, but to keep away from all regular ones, two blue on engine. Detonating signals, or torpedoes, to be used for special duty."

"The above code is the result of much thought, after careful examination of the signal systems in use on the chief railroads of the United States. It will at least furnish a basis for a complete one, to be defined and enforced by national statute."

##### Ohio Falls Car Works.

The following description of these works is given in a report of the Louisville Exposition, published in the Louisville *Courier-Journal*:

"There is nothing more conspicuous or wonderful than the model representation of the grounds and buildings of the Ohio Falls Car Works of Jeffersonville, Indiana, which are said to be the largest works of the kind in the world. From the fact that the works were completely destroyed by fire in March last, since which time, of course, they have not been in operation, the company could not place specimens of their work on exhibition. They would probably have had difficulty in obtaining space sufficient to exhibit a number of cars, if they had been fortunate in having a few specimens on hand. It was important to them, however, that they should make some kind of a show of their great enterprise, and they luckily hit upon the plan of producing a miniature representation of their works, which they placed upon a huge platform between and a little below the galleries in the north end of the building, a position in which the works can be seen to advantage."

tage and reached from the upper floor. The platform is an elegant piece of workmanship, having been gotten up regardless of cost and containing many kinds of wood, including ash, black walnut, butternut, amboine, Canada walnut, cherry, pine, lime and poplar. Over the platform there is suspended a beautiful banner bearing the following inscription: "Ohio Falls Car Works, Jeffersonville, Indiana, organized June, 1864; destroyed by fire March 20, 1872; rebuilt 1872. Joseph W. Sprague, President; William Crichton, Secretary and Treasurer. Directors—D. Ricketts, M. L. Belknap, J. L. Smyser, J. W. Sprague, S. A. Hartwell. Cash capital, \$500,000; twenty-six acres of ground; five and a half acres under roof; three and a half miles of track in yard; capacity, twelve freight cars per day; one hundred passenger cars per year; H. Walters, architect, Louisville, Ky." The model represents thirty-two distinct buildings, and there is not a more meritorious exhibition in the building."

#### Bridge Test in Providence.

On the 8th inst. an official test was made of a new draw and turn-table for the Point street bridge in Providence, R. I., recently completed by Charles Macdonald, of New York, the contractor. The draw was loaded by driving on it two wagons abreast, each loaded with 10 tons of gravel and drawn by four large horses, the whole weighing about 30 tons. This caused a deflection of five-eighths of an inch. The draw is of wrought-iron, 250 feet long, the openings being each 100 feet. The total weight is 250 tons. It, and a new turn-table and locking-gear for it, were designed by Charles Macdonald, C. E., of New York, the contractor. It was erected under the supervision of Robert Grimes, of Wilmington, Del., as foreman of the work.

#### Asbestos Packing.

Of the use of this material for packing stuffing-boxes of locomotives the *English Mechanic* says: "The experiments with asbestos packing in the stuffing-boxes of express locomotives have given results of so satisfactory a nature that steps have been taken by the patentee to establish a manufactory of the new packing in this country, and, accordingly, a company has been formed, and asbestos is now the staple of another industry in busy Glasgow. It seems probable that the employment of asbestos for packing is only the beginning of an entirely new series of manufactures; for though, as mentioned in the article referred to, asbestos was made into cloth in ancient times, there were, doubtless, difficulties in the manipulation of the raw, and defects in the finished material, which prevented it becoming an established industry. In the packing-making process the crude material is broken up by a machine similar in construction to that used in disintegrating the fibres of flax and jute. The loose stuff is then placed in a hopper constructed in sections, where it is compressed and formed into ropes by means of thin canvas strips passing through the hopper from bobbins above. These strips are wound round so as to form a kind of continuous bag, holding the asbestos together as it passes through the forming tube, on emerging from which it is overwound with yarn, and is ready for use. No severer test of the adaptability of this material for packing stuffing-boxes can well be devised than its employment in express locomotives, where the steam pressure is probably 130 lb. on the square inch, and the piston-rod travels through the packing at least 20,000 times in an hour. Those who have the care of steam engines know that the best packing hitherto used will not undergo this treatment long, but after several months of daily duty under these conditions the asbestos packing has been found as serviceable as ever."

#### Pullman in Paris.

The *Engineer* says: "Mr. Pullman, the inventor of the palace cars, is visiting Paris. He comes over to place several of his vehicles on the lines between the French capital and Vienna, in time for the International Exposition in the latter city." This in itself would be one of the most effective exhibitions of American improvements in railroad travel.

#### Novel Caboose Cars.

A set of conductor's cars has been supplied for freight trains on the Great Western Railway of Canada. These cars are divided into two compartments. One smaller than the other, for the accommodation of the conductor and his men, is fitted with stove, comfortable seats, writing-desk, washstand and locker, a brake-wheel perpendicular like a ship's wheel, in addition to the usual platform wheels, so that in bad weather or in an emergency brakes can be applied as soon as asked. The compartment is also fitted with projecting side windows, so that the occupants command a view front and rear. The lamps that light the compartment shine through red glasses in the end of the car, thus serving as guard lights. In the larger compartment one side is fitted with seats for passengers, on the other side are lockers, the lids of which are stuffed to serve as lounges, so that the trainmen have each a locker wherein to secure his personal effects, and at the journey's end they can make up their beds on the lounges and lay their weary forms to rest—a vast improvement on the old plan of wandering when worn out by fatigue at unearthy hours in search of boarding-houses or hard-board couches or overpopulated bunks. The compartment also contains the usual filter, stove and saloon accommodations. Under the body of the car is a receptacle for auxiliary material.

A new arrangement of engine lights has been introduced. Each engine head-light shows on a bar fixed across it the number of the train, so that parties along the line and in charge of trains have no excuse for not knowing what train is passing. The head-lamps are fitted with red shades, which are applied when the engine is running on or blocking the main line, and taken off when the engine is on a siding. The drawback to this arrangement is that red lights are not visible at so great a distance as white ones.

#### Michigan Car Company.

This company, whose works and yard occupy seven acres of land at the corner of Fourth and Larned streets, Detroit, now employs 500 hands, and is turning out freight and construction cars at the rate of twelve per day. They have purchased a plot of 50 acres at the Michigan Central Junction, on which a new car shop and wheel foundry is being erected.

#### New Depot at New Haven.

The *Hartford Post* says: "The new depot of the New York, New Haven & Hartford Railroad at New Haven is to stand in the vicinity of Water and Meadow streets and Custom House Square, and work will be commenced at once. It is estimated that it will take 125,000 cubic yards of earth to fill the marsh at the dyke to the proper level, and when the arrangements are complete the work will go on at the rate of 1,000 yards a day. Earth will be filled upon the marsh to the depth of six or seven feet, and this, when well settled, is expected to bear the tracks during the passage of the trains; but piles will be driven under all the foundation walls of the building in sufficient numbers to insure stability. The plan of the building is not yet completed, and nothing but a general idea can be given with reference to it. It will be 600 feet long, and wide enough to admit of six tracks passing through the center, with spacious platforms, waiting-parlors, baggage-rooms, ticket-offices and the like upon the sides. In the second story of the building will be the rooms of the superintendents and other officers of the roads. The main track of the New York road will remain as it is, and, with this and the other roads the arrangement will be to run the freight trains outside of the building, and the design in general will be to do the coupling and shifting of cars, as far as possible, outside of the building, keeping it free from the continual passing to and fro of en-

gines and empty cars, and reserving the tracks within exclusively, if possible, for the regular passenger trains. By this means it is expected to remove many of the dangers to which passengers and others are exposed in the present depot. The new building, too, will be long enough to render accessible all the cars of long trains, and it will not be necessary, as is now the case, to fill a few of the cars and then move ahead two or three times to bring the others within reach.

"The work will be vigorously prosecuted during the winter, and Superintendent Reed expresses the opinion that there will be very little grass growing in the neighborhood before the walls are up, and by the middle of the summer he expects the work to be completed. The building will be of brick and stone, and under ordinary circumstances fire proof. It will be built by the New York, New Haven & and Hartford Railroad, but used as a union depot by all roads leading into New Haven, the companies paying reasonable rent to the builders."

#### Experiments on Lubricators.

The *American Chemist* says a very elaborate series of experiments was recently made in New York to test the relative value of different lubricators. The experiments were continued during a period of fourteen months. The following were the general results and inferences: The consumption of oil varies with its temperature when applied. Winter sperm oil sustained the heaviest pressure, and was taken as the initial compared for all others, and their percentage of lubricating value determined by it. The tests of mineral oils and mixtures of animal and fish-oil with them would not sustain an equal pressure with the sperm, when equal quantities of the oil were applied, with rapidly increasing the temperature of the journals, and producing an abrasion of their surfaces. When the pressure on the bearings are made equal with winter sperm, it required from 100 per cent. to 400 per cent. increase of oil to keep the temperature of the journals below 100 deg. Fahr. Experiments were made at various velocities with the same oils. The results proved that as the velocity was reduced the pressure could be increased, and the relative consumption of oil, applied at equal temperatures, was decreased in almost equal ratio.

#### Water Tank Indicator.

An electrician employed by the Chicago, Burlington & Quincy Railroad Company has patented an electrical apparatus, which is attached to water tanks to indicate the moment when the tank is full. The instant the water reaches the point established as its limit of height in the tank, a bell begins to ring and continues ringing until the water is drawn down or the bell switched off. Thus the pumper is informed instantly of the time to cease pumping, even though he may be at some distance, or the weather dark or foggy.

The Chicago, Burlington & Quincy Railroad Company have in use a number of tanks, and it is said they have never once failed. A small battery is used, which is kept in the pumper's room, and the cost is said to be little more than the ordinary float, pole, etc. A company called the "Electric Improvement Company," in Galesburg, Ill., is manufacturing and selling the apparatus.

#### Burning of the Watson Manufacturing Company's Works.

The works of the Watson Manufacturing Company at Paterson, N. J., took fire on the night of October 3, from some unexplained cause, and, owing principally to an insufficient supply of water, nearly all the shops were destroyed, the blacksmith shop and pattern storeroom being the only buildings saved. The loss is estimated at \$75,000, on which there was \$35,000 insurance. The company employed about 400 men and at the time of the fire had a large number of orders on hand both for iron and combination bridges. The shops are to be re-built at once, work having been already commenced, and in the meantime there will be very little delay in filling their orders, as several buildings have been rented and some temporary wooden buildings erected.

#### Burlington & Missouri River Cars.

The following extract is from a description of the shops of this company in the *Burlington Hawkeye*. The new passenger cars are thus described:

"These coaches are forty-five feet in length, and are mounted on four-wheel trucks of a new pattern, designed by Mr. George Chalender, who has for many years filled the position of Master Mechanic of this road. It is so simple in form that it requires no skilled labor, and, in case of a break, it can be immediately and easily repaired. Another peculiarity of these cars is the introduction of an iron plate, running the whole length of the car, between the floor and the windows. The old custom of wainscoting this space in wood is unsatisfactory, as the wood shrinks, leaving cracks through which thin drafts of air strike the feet of the passengers. The iron belt which surrounds this part of the car is calculated to obviate this difficulty. There is no doubt that these will be the most comfortable winter cars in use.

"As an illustration of the great labor expended on the finishing and ornamentation of these cars, we may state that each car receives on its outside fifteen coats of paint and varnish.

"Besides the passenger coaches, the company are building several 'accommodating' cars to accompany freight trains. These are also being constructed in finer style and with greater conveniences than heretofore. The freight-car department is building fifty new cars. These are being turned out at the rate of one each day. These cars are also mounted on a patent truck, another invention of the indefatigable George Chalender. The average cost of these freight cars is \$840.

"Another feature of the present fall work is the changing of about 75 flat cars into coal cars for the transportation of coal from the different Iowa mines eastward."

#### The Invention of the Steam Whistle.

A correspondent of the *Engineer* attributes the invention of this instrument to Adrian Stephens, formerly chief mechanic at Plymouth Works, then of Dowlais, and now still living, but quite aged. It was invented about the year 1835, and was at first applied as a low-water detector.

#### The Whistle Nuisance.

On this subject "F. G. W." writes to the *American Railway Times* as follows:

"I notice that there is now some discussion going on relative to the whistle nuisance and its remedy. Where crossings at grade are as numerous as they are here in New England, and where pedestrians are almost constantly to be seen upon the track, I am sure it would be poor policy not to give engineers some ready means of sounding a lusty alarm; and I cannot conceive of anything more handy or efficient for this purpose than the present whistle arrangement. If any one has doubts about this matter let him ride a short time with an engineer upon the foot-board.

"If whistles were toned down to a much lower key, as suggested by another correspondent, and their use restricted to a few short sounds in cases of apparent danger, and to the calling for the brakes while near thickly settled localities, there would be but little occasion for complaint.

"It is the continuous screech of these high-toned whistles for half a mile, more or less, upon a stretch, that is such an egregious annoyance; there can be no necessity for such an outrageous noise in any case, and it ought to be suppressed like every other nuisance. Four or five lusty toots in close succession, of a milder key, would be sufficient for any emergency, as far as the whistle is concerned.

"In this connection I would suggest that the throttle valves of locomotives be so constructed as to open and close a small steam port of sufficient size to sound a small whistle, before

the passage to the cylinders begins to open, so that the first slight movement of the throttle lever shall sound the whistle, and the second movement shall close the whistle port and open the ports leading to the cylinders; then it would be impossible to start an engine without previously announcing the fact. I would suggest also that instead of the ungainly long pole gates that are so frequently used at crossings, two light drop gates be employed at each crossing balancing each other, so that when one goes up the other comes down; they might be very light and could be operated in one-quarter of the time now required to operate the present long horizontal pole gates."

#### Dangers of Underground Railroads.

The *London Daily Telegraph* says:

"A correspondent calls attention—not before it was necessary—to the perpetual risk of frightful accident which is run on our underground railways. He speaks especially of the guards, who perform a hundred acts of perilous acrobatics in the course of the day's work, shutting the open doors and leaping into the train while it is flying out of the station. He describes an instance where death was avoided almost by miracle, and we suppose that, upon the present breathless neck-or-nothing system of 'conducting,' death in its most awful form is the only reformer, who will spare us the constant terror of seeing an underground guard crushed into pulp. But we would add a word for the hapless passengers. The incessant hurry at these subterranean stations, the nerve-shaking slamming of every carriage door, the hideous yell of the engines, the difficulty of distinguishing one train from another, or of getting a coherent answer to a question from the fevered and inarticulate officials—all these peculiarities, with the oppressive atmosphere and spine-convulsing way of putting on the brakes, render underground lines as terrible as they are useful. We do not ask to breathe, nor to have time to enter and leave the trains; we are all prepared to rush, to push, to scramble, and to sink breathless into our seats upon the chance of being right. But if the doors were padded, if the guard were spared that daring feat of leaping, with his life in his hand, into the flying van, and if the trains had a plain distinctive mark upon some spot where it could be seen, we should all be grateful, and headaches and palpitations which are carried to the 'upper day' would not be quite so frequent."

#### A Lady Contractor.

An exchange says that Mrs. Catharine Strange, of Ottumwa, Iowa, has just completed the grading of two miles of railroad near that town. This is certainly a new field for the industry of women, and one that has not heretofore been mentioned.

#### OLD AND NEW ROADS.

##### Baltimore & Potomac.

The plans for the new depot in Washington have been completed. The main building will have a frontage of 140 feet on B street with a depth of 95 feet on Sixth street. In the rear of this will be an iron building for the accommodation of trains, which will be 120 feet wide and 500 feet long. This will be one of the finest depots in the country. Proposals have been received for the construction of the foundation, and the contract will be awarded in a few days.

##### New Haven & Derby.

The earnings of this road during the past year have exceeded its expenses by \$40,000. The road is about nine miles long.

##### New Ulm & Redwood.

Preliminary surveys are to be made at once for a railroad from New Ulm, Minn., northwest up the Minnesota River to Redwood, a distance of about 40 miles. The engineers of the Winona & St. Peter road will make the survey.

##### Winona & St. Peter.

Track is being laid at the rate of two miles a day. A large number of the men who were lately discharged from the St. Paul & Pacific road have found employment on the Winona & St. Peter and the road will probably be finished sooner than was expected.

##### Western Maryland.

At the recent annual meeting of this company in Baltimore, the Chief Engineer reported that the construction of the Baltimore Division was progressing satisfactorily and would be completed by June, 1873. Work on the Williamsport Division has been suspended since the abandonment of the work by the contractors. The improvement of the road has been pushed forward, five bridges have been renewed and heavy stone abutments built for three others. One hundred and ninety tons of new rails, 15,892 new ties and 13,237 perch of stone ballast have been put into the track. The Superintendent reported that the equipment has been increased during the year three locomotives, four passenger coaches, twenty-one freight and stock cars, five hand and six truck cars.

The Treasurer's report shows the receipts from freights, passengers, mail service, &c., \$197,707.66. Expended for transportation, repairs of road, machinery, cars, bridges, &c., \$160,133.85; interest on loans and funded coupons, \$30,474.83.

The loans on the second preferred bonds have been placed at a much lower rate of interest than formerly.

Five hundred and twenty-five thousand dollars of bonds endorsed by the city of Baltimore have been surrendered and canceled, and \$1,000,000 city stock received, of which \$667,300 has been sold at full market rates, leaving \$332,700 uncollected and held as a separate fund as required by the ordinance granting the loan.

##### Perkiomen.

The engineers have surveyed several lines through the Saucon Valley for the extension of this road from Green Lane to Allentown. It is said that a line has been found by which the grade will not be over 26 feet to the mile.

##### Nashua & Acton.

The grading is finished for three and a half miles from Nashua.

##### Nashua & Rochester.

Work has been begun on this road on nineteen sections. It is said that the road will be completed to Epping, 23 miles, by December 1, and cars will then be run to that point. The piers supporting the bridge over the Merrimack at Nashua, two in number, are under contract to be built, at a cost of \$12,000 each.

##### Freehold & Keypoint.

It is rumored that this road has been purchased by parties who will complete it from Keypoint, N. J., to Freehold at once, and then extend the line to Manchester, and eventually to the Delaware River, with branches to Point Pleasant and Tom's River. The extension from Freehold to Manchester would be close to the New Jersey Southern road.

##### Peach Bottom.

Work on this Pennsylvania road is being pushed forward and the *York Despatch* says that many of the stockholders are aiding the construction of the road by working on the grading in person.

##### Vermont Valley.

The extension to South Vernon, to connect with the Connecticut River Railroad, which some of the stockholders proposed

to build, has been abandoned. As the Vermont Central Company has a twenty years' lease of the road, commencing in 1871, the proposed extension would be of no use for nineteen years to come.

#### Boston, Clinton & Fitchburg.

This company has petitioned the Supreme Court of Massachusetts for the appointment of three commissioners, as provided in the act of the Legislature establishing a union depot at Fitchburg.

#### European & North American.

A committee of the board of directors of the European & North American Railway Company of Maine has met a committee from the New Brunswick Company of the same name, to arrange a basis for the consolidation of the two companies. The general principles of union have been agreed upon, and it is expected that the details will be all arranged in a few weeks, when meetings of the stockholders will be called to ratify the agreement.

#### Buffalo, New York & Philadelphia.

The iron is laid on the southern end of this road from the junction with the Philadelphia & Erie road at Emporium, Pa., up the Portage to a point above Minard's Mill.

#### Mount Alto.

This road leaves the Cumberland Valley road two and a half miles east of Chambersburg, Pa., and runs south about 17 miles to the Mount Alto Iron Works. The road is completed for about 13 miles, and the remaining four miles will soon be in running order.

#### Pennsylvania Petroleum.

Mr. M. B. Barr, who has the contract for that part of the line between Cambridge and Erie, Pa., and also for the docks at Erie, has commenced work on the docks.

#### Pittsburgh, Virginia & Charleston.

Cars are now running to Green Spring, and the work is being pushed forward up the Monongahela.

#### South Kentucky.

This company, which purposed to build a narrow-gauge road from a point on the Ohio River south through Union County, Ky., has asked that county for a bonus of \$150,000 in bonds, and an election is to be held November 2 to decide the question.

#### Missouri, Kansas & Texas.

The track is reported to be within 25 miles of Red River. The work on the bridge over that river is progressing rapidly. The cattle trade of the road is increasing very fast, 83 car-loads having been shipped north from the present terminus in one day. Large stock-yards are to be built at the terminus of the road, Denison, a new town south of Red River.

Texas papers report that the trouble which had arisen between this company and the Houston & Texas Central has been amicably adjusted. The point of junction of the two roads is to be three miles south of Red River and 12 miles north of Sherman, Texas. The question of right of way has also been adjusted.

#### Rensselaer & Saratoga.

It is said that the Green Island Branch will be open for travel early in November. The Utica (N. Y.) *Herald* says:

"It has been said that upon the completion of the Green Island span the branch of the Rensselaer & Saratoga Railroad between West Troy and Waterford Junction would be abandoned. It is reported that the railroad managers have no such idea in contemplation. The railroad interests at Cohoes alone would forbid the abandonment. Hereafter the branch will be used as it has been in the past."

#### Cairo & St. Louis.

Tracklaying commenced opposite Carondelet, October 10, and the work is being pushed forward as fast as possible. The contract for grading the road-bed from a point opposite Carondelet to East St. Louis has been let, and the work is to be finished in 25 days. A cargo of iron is daily expected at Cairo, and when it arrives tracklaying will begin at that end of the road.

#### Walla Walla & Columbia River.

Oregon papers say that this road, from Walla Walla to Wallula, will not be finished this fall, but everything will be prepared to finish the road early in the spring.

#### North Pacific Coast.

The Board of Supervisors of Marin County, Cal., has refused to submit the question of granting a subsidy to this company to a vote of the people.

#### La Crosse Bridge.

The Secretary of War has telegraphed to La Crosse, Wis., that the location of the bridge over the Mississippi at that town, as made by the board of engineers, is approved. This is the location opposed by the Milwaukee & St. Paul Company.

#### Monroe & Dubuque.

The Dubuque (Iowa) *Telegraph* of October 19 says:

"It is rumored that the contract for the construction of this road has been let as far as Shullsburg, Wisconsin, the cost per mile agreed upon being \$20,000. Our informant states that he has it from good authority that the contract has been signed by Alexander Mitchell, President of the road now in question, and of several other Wisconsin roads."

The distance from the Mississippi River to Shullsburg is about 20 miles. The whole length of the road to Monroe, Wis., will be about 55 miles.

#### Springfield, St. Charles & St. Louis.

This road is intended to run from Springfield to Grafton, Ill., then across the Mississippi and through St. Charles to St. Louis. The line from Springfield to Grafton, which is about 75 miles long, has already been surveyed.

#### Bangor & Calais Shore Line.

The town of Sullivan, Me., has voted to take \$8,000 stock in this company. Machias, East Machias, Cherryfield and Columbia Falls have voted to take stock to the amount of five per cent. of their valuations in 1870.

#### Grand Trunk.

This company is reconstructing its wharves in Portland, at an expense of over \$50,000.

#### Fitchburg.

This company has purchased ten acres of land in Waltham, on which the new machine shops of the road will be located.

#### Boston & Maine.

This company is having 16 locomotives built at the Amoskeag Works, Manchester, N. H., for use on its Maine Extension. The first one, a 30-ton engine, with 16x24 cylinders, and driving-wheels five feet in diameter, has been delivered.

#### Massachusetts Central.

The work on this road is progressing well. Between 40 and 50 miles of the road are ready for the ties, but it is said that no track will be laid before spring. It is said that 1,000 men are at work on the line. A reduction of the wages of the laborers has lately been made, from \$2 to \$1.75 a day; this reduction resulted in a few strikes at certain points on the eastern division of the road, but none in the western division. Work is be-

ing gradually resumed, and during the present week the entire force will again be on duty, the places of the strikers having been filled by other men.

#### Athol & Enfield.

The contractors have resumed work on the extension of the road to Springfield.

#### La Crosse, Houston & Decorah.

A railroad is proposed to run from Houston, Minn., which is on the Southern Minnesota Railroad 18 miles west of La Crosse, southwest about 40 miles to Decorah, Iowa. Decorah is the terminus of a branch road which extends to Calmar, on the Iowa & Minnesota Division of the Milwaukee & St. Paul. The above title has been adopted for the road, and steps taken to have a preliminary survey made.

#### Watchung.

The grading on this road is now well advanced, and the work is being pushed forward with the hope that the road may be ready for use as soon as the main line of the Montclair Railroad is open. The road extends from a junction with the Montclair Railroad just west of Belleville, N. J., west to Orange, a distance of about four and one-half miles. It will be operated as a branch of the Montclair.

#### Philadelphia, Wilmington & Baltimore.

The new line from Philadelphia to Chester is now completed, and trains will commence running over it early in November. This new line leaves the old road at Gray's Ferry, two miles from the depot in Philadelphia, and crossing Darby Creek runs southeast in nearly a straight line until it rejoins the old road just above Chester. It is more direct and passes through a better country than the old line, which was close to the Delaware, and followed nearly the line of the river. The new road is exceedingly well built, and has double tracks, laid with steel rails, one side being of American and the other of English make. The depot buildings are all of stone, in uniform style and well finished. The stations and distances from the depot to Philadelphia are:

Paechville	4	Ridley Park	9
Darby	5	Crum Lynne	10
Sharon Hill	6	Simpson	12
Glen Olden	7	Chester	14

At Ridley Park a company of which Mr. Samuel M. Felton is President, has purchased a tract of 600 acres of land and is laying out a large and very beautiful suburban village. The new line is expected to develop a very large suburban traffic in addition to the through traffic which will pass over it. The old road has been sold to the Philadelphia & Reading Company, which will use it to connect with the new coal depot which is to be established below Philadelphia.

#### Vermont Central.

On the 9th the Conference Committee appointed at the great Boston meeting on the 2d to confer with the trustees and managers with relation to the necessary action to meet the immediate liabilities, and the propriety and methods of placing the roads under corporate management made their report. Most of it is a repetition and confirmation of statements made in the report of the trustees and managers the week previous. They count most of the floating debt as cost of new property, and regard the deficit on the leased Rutland and Ogdensburg & Lake Champlain roads as a bonus paid by the trustees for obtaining property and business facilities of great value to the line of road managed by them, and for removing a competition which has always been damaging, and which was on the point of becoming ruinous. The Committee endorses the proposition of the managers to issue a new loan of \$2,500,000 8 per cent. bonds, and these are offered at 95, and the security-holders and creditors of the company are invited to subscribe for them. The terms are \$300 on the 1st of November, December and January for each \$1,000 bond, the subscription not to be binding unless one million is subscribed by October 26. Accompanying the report were subscriptions for \$405,000, there being \$100,000 each from J. Gregory Smith, J. Clark Milton by J. Gregory Smith, and B. F. Cheney. At the meeting where the report was made, \$750,000 more was subscribed.

#### Bridgeton & Port Norris.

Trains on this road are now running from Bridgeton, N. J., to Mauricetown, about 19 miles, leaving only four miles more of track to be laid. The work is being pushed forward as fast as possible.

German Valley.

This company is now engaged in securing the right of way for the road through Hunterdon County, N. J. It is said that contracts have been let and that work will soon be commenced near High Bridge, on the New Jersey Central.

#### Montclair.

The long cut through the hill at Kearney, on the east side of the Passaic River, is at last completed, and the rails are laid through the cut and to the Hackensack River. The trestle-work east of that stream on which the road is to be carried to the junction with the Midland road is making rapid progress, and the bridge on which the road will cross the Morris & Essex Railroad will be put up before the end of the month. It is expected that trains will be running from Jersey City to Pompton by December 1. The road, which is leased by the New York & Oswego Midland, extends from the junction west of Bergen Hill through Belleville, Montclair and Mead's Basin to a junction with the Midland Company's other New Jersey line at Pompton. The road is about 24 miles long, and while, at its southeastern end, it will be exposed to a sharp competition with older lines, the northern end of the line passes through a comparatively new country.

#### Shenandoah Valley.

The Central Improvement Company advertises for proposals for the graduation and masonry of the Second Division of the Shenandoah Valley Railroad, from Milford to Luray, Va., a distance of about 15 miles. Profiles, estimates and specifications can be obtained from James W. Morris, Chief Engineer, at the office of the Central Improvement Company, at Charlestown, Jefferson County, West Virginia. Proposals will be received until November 20, 1872.

#### Quincy, Missouri & Pacific.

Trains are now moving regularly between West Quincy and Kirksville, Mo. The intermediate stations and their distances from Quincy are as follows:

Quincy	— La Belle	32
West Quincy	2 Knox	38
Maywood	11 Edina	47
Durham	15 Hurdland	54
Tolona	21 Kirksville	70
Lewistown	26	

There are two trains daily, a mail and express leaving Quincy at 4 p. m., and freight leaving at 5 a. m. The former makes the 70 miles to Kirksville in 4½ hours, and returning leaves Kirksville at 6:45 a. m.

#### Wisconsin Central.

Work on this road is progressing well. Between 40 and 50 miles of the road are ready for the ties, but it is said that no track will be laid before spring. It is said that 1,000 men are at work on the line. A reduction of the wages of the laborers has lately been made, from \$2 to \$1.75 a day; this reduction resulted in a few strikes at certain points on the eastern division of the road, but none in the western division. Work is be-

Messrs. Staughton Brothers, who have the contract for that part of the road. This section of the line passes through a very difficult country, required some heavy work and involving a large outlay of money. The contractors have labored under many difficulties, and the St. Paul *Press* says that in some cases they have had to pay as much as \$70 per ton for the transportation of their supplies, as everything had to be packed for some distance on men's backs.

#### Ogdensburg & Water Gap.

A railroad is proposed to run from Ogdensburg, N. J., on the New Jersey Midland Railroad, west through Newton, in Sussex County, to a junction with the Delaware, Lackawanna & Western Railroad at the Water Gap. The Midland Company proposes to iron and equip the line from Ogdensburg to Newton, about ten miles, provided the people will give the right of way and do the grading. This section of the line is close to the line of the Sussex Railroad. The remaining section, from Newton to the Water Gap, about 25 miles, would pass through a thinly inhabited and very hilly country.

#### St. Paul, Stillwater & Taylor's Falls.

This company has made application to the District Court at St. Paul, Minn., for the condemnation of thirty blocks of land in the city, the land to be used by the company for depot buildings, side tracks, etc. It is understood that the Chicago & Northwestern Company were concerned in this application, and that a large portion of the land is intended for the use of that road, which will have its entrance into St. Paul over the above road.

#### Lake Superior & Mississippi.

A year or more ago some citizens of St. Paul, Minn., resisted the payment of a tax levied to pay the interest on bonds to the amount of \$200,000, which had been issued by that city, to aid in the construction of the Lake Superior & Mississippi Railroad. Judge Hall of the Court of Common Pleas at St. Paul decided that the tax was unlawful, but the case was appealed, and the Supreme Court of the State has just reversed the decision of the lower court, and established the legality of taxes levied for the payment of both interest and principal of bonds issued as a bonus to railroad companies. This decision immediately affects not only the \$200,000 of bonds above referred to, but also the \$100,000 issued by St. Paul to the St. Paul & Chicago Railroad Company, and the \$50,000 issued for the construction of the railroad bridge at that place. It is also, of course, applicable to a very large amount of bonds issued by other towns and counties in the State.

#### Texas & Pacific.

This company has asked for a subsidy of \$75,000 from Grayson County, Texas, and offers to make a depot at Sherman, and also one in the eastern and one in the western part of the county. The company has also asked \$60,000 from Denton County and \$20,000 from each of the towns of Pilot Point and Denton, on condition of passing through those towns. Contractors have commenced operations at Dallas, Texas, and at the Trinity River. Work on the bridge over that river has also been commenced. It is said that the company intends to import a number of Chinese laborers to work on the road.

#### Sioux City & St. Paul.

The first regular passenger train from St. Paul through to Sioux City left St. Paul October 14. For the present the company will run one train through each way daily, besides an accommodation to Mankato. There will be two through freight trains and a local freight to St. James.

#### Evansville, Terre Haute & Chicago.

The stockholders of this company have voted against the proposition to lease their road to the Chicago, Danville & Vincennes Company.

#### Peoria & Springfield.

The grading of this road is going forward rapidly, and it is expected that it will be completed early next year.

#### Atlanta & Richmond Air Line.

The stations and distances on the section now completed from Charlotte, N. C., westward, are: Charlotte to Garibaldi, 13 miles; Gastonia, 22; King's Mountain, 35; Whitaker's, 43; Black's, 48.

#### California Central Narrow Gauge.

This company, which filed its certificate of incorporation with the Secretary of State of California, October 10, asserts its purpose to build the following narrow-gauge roads:

First—From a point at or near the city of Sacramento, through the county of Solano, to the city of Benicia. Second—From a point at or near the city of Sacramento, through the counties of Sutter and Yuba, to Marysville. Third—From a point at or near the city of Marysville, through the counties of Yuba, Sutter and Butte, to Chico. Fourth—From a point at or near Maine Prairie, through the counties of Solano, Colusa and Tehama, to the town of Red Bluff. Fifth—From a point at or near the city of Nevada, in Nevada County, through said county and the county of Yuba, to the city of Marysville. Sixth—From a point at or near Colusa, through Colusa County, to a point in Cache Creek Valley, near the boundary line of said county and the county of Yolo. Seventh—From the terminus of the Colusa branch above mentioned, through Cache Creek Valley and through Lake County, to Lakeport. Eighth—From a point at or near where the Putah Creek crosses the Red Bluff road, in the county of Yolo, through said county and the county of Napa, to Berryessa Valley. The length of these roads is to be four hundred miles. Capital stock, \$7,000,000. Directors—John W. Pierson, R. L. Tracy, Cornelius Cole, H. F. Williams and M. D. Townsend.

#### Lake Erie & Elyria.

Meetings of the stockholders of this company and of the Lake Shore & Tuscarawas Valley Company are called, to be held in Cleveland, October 31, for the purpose of voting to consolidate the two companies.

#### Ashtabula, Youngstown & Pittsburgh.

Trains are now running to Champion, five miles from Warren. This is about ten miles from Bloomfield, the late terminus, and about 42 miles from Ashtabula.

#### Railroads in New Zealand.

The *Engineer* says: "This flourishing colony has made a fair start in laying out its railway system. An English firm has contracted to build 125 miles of road at a cost of £484,000, or £3,872 per mile. The lines to be constructed are, from Auckland to Waikato, 41 miles; a short line of eight miles at the southern extremity of New Ulster, or North Island; a short line of eight miles will be constructed between Wellington and Hutt, in the valley of the Hutt. The other contracts are for a line from Invercargill, in the province of Southland, at the southern extremity of the island, to Mataura, in the valley of the river of that name; length of line 42 miles. Another line of 34 miles is to be made from Dunedin, Otago, to Clutha. The next work to be undertaken after the lines now contracted for have been completed will probably be a connecting line between Mataura and Clutha, which will give continuous railway communication between the ports of Otago and Invercargill. The great work that will still remain will be a trunk line of more than 400 miles in length through the provinces of Southland, Otago, Canterbury and Nelson, to the port of Nelson. The contractors are sending their workpeople from England, and have already in five batches sent out more than 700

emigrants, including a proportion of women and children, and not a few agricultural laborers. The last vessel with nearly 300 emigrants—men, women and children—has just sailed, which makes about 1,300 souls added to the population of the colony."

#### Cleveland, Columbus, Cincinnati & Indianapolis.

This company is about to put on a through train to run from Columbus, Ohio, by way of Springfield and Dayton, to Indianapolis.

#### Detroit River Railroad & Bridge Company.

This company has accepted the conditions upon which the Board of Supervisors of Wayne County have granted them authority to build a bridge across the west channel of Detroit River, from the mainland to Grosse Isle, and from thence to Stony Island.

#### Green Bay & Lake Pepin.

The track is laid to Amherst, 70 miles from Green Bay, and five miles further than our last account. The grading is completed to Plover, 12 miles beyond Amherst. On the other end six miles of the road east from Merrillton is now ready for the ties.

#### Mississquoi & Clyde Rivers.

Work is progressing from both Richford and Newport, and iron is being laid. The track-layers from Richford have reached Troy, a distance of 15 miles, leaving only a small gap to be closed.

#### Port Royal.

The track on the western end of the road is laid from Augusta, Ga., to Sand Bar Ferry, where the road crosses the Savannah River, a distance of nearly four miles. Considerable progress has been made on the bridge, and it is expected that it will be finished by December 1. Work on the grading on the South Carolina side of the river is also going on, and it is thought that by the time the bridge is finished, these grading parties will meet those working from the lower end of the road.

#### Rochester, Nunda & Pennsylvania.

This road is nearly completed from Mount Morris, N. Y., south to Angelica, in Allegany County, a distance of about 32 miles. It is expected that cars will be running to Angelica before winter.

#### Bennington & Glastonbury.

This road from Bennington, Vt., northeast to Glastonbury, about nine miles, is now completed.

#### Fredericksburg & Charlottesville.

Work is to be resumed on this road at once, and it is expected that it will be finished from Fredericksburg, Va., to Orange Court House by spring.

#### Paris & Decatur.

This company, which has 56 of its 76 miles of road completed, has placed upon the London market an issue of \$1,200,000 first mortgage 7 per cent. gold bonds, at 78 per cent. (gold) of their face, making the interest to the investors about 10 per cent. It has an arrangement with the Indianapolis & St. Louis Company for running trains over the latter road from Paris to Terre Haute, 19 miles. The officers are Dwight Hitchcock, President; W. T. Sylvester, Vice-President; Lucius McAllister, Secretary; Jacob Willis, Treasurer, all of Paris, Ill.; and Robert G. Hervey, Managing Director, Chicago.

#### National.

The suit for an injunction restraining this company from constructing a new railroad across New Jersey, brought by the United Railroad & Canal Company and the Pennsylvania Railroad Company, came up before the Vice-Chancellor of New Jersey on the 15th inst., but was postponed at the instance of the defendant till the 29th. The bill claims, among other things, that the Stanhope Railroad bill is a fraud, and that the plaintiffs have certain rights which must be protected by the courts.

#### Springfield & Northwestern.

A telegram from Springfield, Ill., says: "The obstacles which have so long prevented the completion of the Springfield & Northwestern Railroad have been surmounted, and the line will be finished to this city as rapidly as possible. For nearly two years the impediment to the building of the line was the question whether it should run on the north or south side of the Sangamon River from here to Petersburg. At the last annual meeting this dispute terminated in the election of two boards of directors. These two boards met at the Leland today and compromised all their difficulties, and agreed upon several points, the most important of which is that the line shall be built at once, upon the Athens route, south of the river."

In this telegram "south" is probably misprinted for north, as Athens is north of the Sangamon River. Later news is to the effect that the differences have not been settled, though the work of construction will be prosecuted.

#### Springfield & St. Louis.

A telegram from Springfield, Ill., says that Dr. S. H. Melvin, the President of this company (also President of the Gilman, Clinton & Springfield), has entered into a contract which secures beyond any doubt the construction of this line from Springfield nearly due south 45 miles to Litchfield, where it will connect with the Decatur & East St. Louis Branch of the Toledo, Wabash & Western, over which it has acquired running rights. It is to be completed by next July. This will make a line 93 miles long from Springfield to East St. Louis, which is two miles less than the Chicago & Alton's line; and one from Chicago to East St. Louis 285 miles long, against the 280 of the Chicago & Alton. The contractors are Ware & Co.

#### St. Louis & Iron Mountain.

The Arkansas Branch is completed to the Missouri State Line, nine miles beyond Neely's Swamp, the last point reported. At the State line connection will be made with the Cairo, Arkansas & Texas (formerly the Cairo & Fulton) road.

#### Kansas Pacific.

This company has recently sold a tract of 23,000 acres of land to an English gentleman, who proposes to settle an English colony upon it. The tract is on the line of the road in Ellis County, Kansas, near Fort Hays, and about 300 miles west of Kansas City. The place is to be called Victoria.

#### Kansas City & Independence.

Blue township, in Jackson County, Mo., has voted \$100,000 for a narrow-gauge railroad from Kansas City to Independence, Mo.

#### Bedford & Bridgeport.

The Philadelphia *Public Ledger* says: "Last week we were invited to accompany an excursion party on the Huntingdon & Broad Top Railroad and the Bedford & Bridgeport Railroad into the Cumberland coal-fields. The latter road has just been finished, and forms a continuation of the Broad Top road to the State line, at which point it connects with a branch road of the Cumberland & Pennsylvania Railroad (also just finished), the whole forming a new outlet for the coal of that region and for passenger travel, connecting two important points on two great trunk lines, viz: Huntingdon, on the line of the Pennsylvania Railroad, and Cumberland, on the line of the Baltimore & Ohio Railroad, the distance between these two places being 89 miles. As a coal route from Mount Savage to the waters of South Amboy, the distance is 360 miles, which is con-

siderably less than the route now used for this coal via the Baltimore & Ohio Railroad and its canal connections to New York, with the further advantages of its being an all-rail route for shipments the whole year round. The coal tonnage of the Cumberland & Pennsylvania Railroad last year was 2,815,153 tons, and is increasing largely each year. We noticed among the coal operators of that region the most friendly disposition towards this new avenue, and there seems to be but little doubt that it will be used to its full capacity. The Huntingdon road becomes important in view of these new connections and business. Iron ore of good quality are plentiful throughout the length of the road, and the furnaces recently erected have been very successful."

#### Davenport & St. Paul.

Trains from Davenport now connect at Delaware Center with trains on the Iowa Division of the Illinois Central road, thus making a new rail route from Davenport to Dubuque.

#### Chicago, Dubuque & Minnesota.

The grading from Brownsville, Minn., the present terminus north to La Crescent is finished, the ties are delivered, and track-laying is to be pushed forward.

#### Chicago, Clinton & Dubuque.

The heaviest part of the grading from Sabula, Iowa, the present Southern terminus, to Clinton is done, and work is being pushed forward. It is hoped that the line will be completed this season. The distance from Sabula to Clinton is 18 miles.

#### West Wisconsin.

The Reedsburg (Wis.) *Free Press* says that about four weeks will be required to complete the tunnel at Elroy, on the branch road.

#### Chicago & Northwestern.

The Sparta (Wis.) *Herald* says of the work at Tu'nel No. 3, on the Madison Extension, that "Messrs. Ellis & McDonald are making good progress in their tunneling. They are working from five faces, and have excavated over 900 feet in all, and the work is being pressed with the utmost vigor day and night. Track-laying westward from this point to the junction is progressing daily, and the gap will soon be closed up. Eastward it has reached Hickory Hill."

#### Galena & Southern Wisconsin.

The Platteville (Wis.) *Witness* says that the company has had an offer for the iron which will probably be accepted, that the ties are on hand, an engine has been purchased and construction cars are being built.

#### Kansas City, Emporia & Walnut Valley.

Osage County, Kansas, has voted \$175,000 in bonds in aid of this road. Engineers have begun to survey the line between Ottawa and Emporia, Kan.

#### Indiana & Illinois Central.

The *Tuscola* (Ill.) *Journal* says: "As we stated last week the entire Western Division of this road has been put under contract, including the Wabash River bridge at Montezuma. Messrs. C. A. Manners & Co. inform us that their portion of the work—grading, putting in culverts and putting in piling—will be done inside of 60 days. They have had a large force on a new road in Ohio, which is now being transferred to this line. The iron for the entire Western Division has been purchased, and 2,000 tons are to arrive at the crossing of the Indiana & Illinois Central and the Evansville, Terre Haute & Chicago roads during the present month. Track-laying will commence at that point, and the work will be pushed west."

#### San Francisco & Colorado River.

An immense petition having been submitted to the Board of Supervisors of San Francisco, asking that a proposition to subscribe ten millions to the stock of the Atlantic & Pacific Company, in order to secure a line competing with the Central Pacific, be submitted to a vote of the city, that Board instead voted to submit a proposition to give absolutely ten millions to the San Francisco & Colorado River Company, which was suspected of being an offshoot of the Central Pacific. Now the San Francisco & Colorado River Company publishes a card saying:

"We are reluctantly compelled to admit that, after a diligent and careful canvass of the city, we ascertain that there exists a very general and fixed prejudice against any further railroad subsidies. Therefore, under the decided conviction that the people at this time are opposed to granting aid to railroads, we abandon for the present all efforts to obtain a subsidy."

#### United States Rolling Stock Company.

This company has removed its office from No. 9 Nassau street to rooms 5 and 6, No. 74 Wall street, corner of Pearl, New York.

#### Iowa Eastern.

Trains are now running regularly on this narrow-gauge railroad, and it is thought that it will be completed from McGregor to Elkader by winter.

#### Lee & Hudson.

One hundred men are now at work on this railroad, a large number being employed near West Stockbridge, Mass., whence the office of the company will soon be removed.

#### Wilmington & Western.

This road is completed from Wilmington, Del., west to Landenburg, Pa., on the Pennsylvania & Delaware Railroad, and trains commenced to run regularly October 21. Three trains are run daily, two passenger and one mixed. The stations on the road are: Wilmington; Green Bank, Falkland, Wooddale, Mount Cuba, Ashland, Auburn, Hockessin, Southwood, Broad Run and Landenburg.

#### Michigan Midland.

The Detroit *Tribune* says that the name of this company will be hereafter called the Canada & Michigan Midland, and that the Canada Southern Company has agreed to iron and equip the road.

#### Steam on the Erie Canal.

The Buffalo *Commercial* says:

"The success that some of the competitors for the State's prize of \$100,000 are meeting with on their trial trip is, on the whole, probably as much as could be expected. The steamers are subject to many delays now that would be unknown if all the vessels on the canal were moved by steam. The horse-boats are not disposed to be over accommodating to their new rivals, and, as a result, the steamers, to avoid collision or running aground, are sometimes obliged to follow after a slow-paced horse-boat for a considerable distance. More or less difficulty is also experienced on account of tow-lines. But if it shall be demonstrated that steam can be employed to advantage, these embarrassments will all disappear in a short time."

"The steamer William Baxter started October 12 on her second down-trip. She has already made two westward voyages. On the last she brought up 113 tons of freight, consuming five tons of coal. Her time from Troy to Buffalo was 110 hours, or less than five days. This is a great improvement on the first trip, and it is also considerably less than the average time made by horse-boats. On the first eastward voyage the Baxter had 201 tons on board, and made the through trip to New York in nine days, consuming five tons of coal. In going down the Hudson River from Troy, she beat the steam tow barges of twelve hours into New York. The expense per mile for fuel,

engineer and fireman was 12½ cents. The regular towing rates this season are 35 cents per mile. In addition, therefore, to the saving of five days' time on the passage, it cost 22½ cents less per mile to propel this steamer than it does to tow the boats now in use.

"Mr. Baxter, the owner of this steamer, is so sanguine of success that he purposes building twenty more boats the coming winter, after the plan of the Baxter. From this it will be seen that the State's prize is not the great consideration with him. If he can devise a steam canal-boat that will make the round trip in about half the time now taken, and at much less expense, as he expects to, he may be very well satisfied, as it will be a mine of wealth to any man."

#### Hoosac Tunnel.

The workmen in the central and eastern sections are now only about 600 feet apart, and those in one section, it is reported, can hear distinctly the drilling in the other.

#### An Old Car.

A railroad car built in England in 1837, and in use on the Veazie Railroad from Bangor to Oldtown, was partly destroyed by fire the other day.

#### Central of New Jersey.

There having been some controversy as to what the court actually decided in the suit brought against this company by the Delaware, Lackawanna & Western, to obtain an injunction restraining the payment of a dividend, the following report of the decision will be interesting:

"The preliminary injunction was denied and the cause held for final hearing. The Vice-Chancellor in stating his views said he considered it clear that the agreement between the companies was one that the act required to be filed. He thought there was no escape from the conclusion that each of the companies had disposed by the agreement of a part of their franchises. But the question whether the omission to comply with the requirements of the act rendered the agreement absolutely void, notwithstanding what has been done under it, was more open to doubt. The language of the act was "unless such contract or agreement is lodged with the Secretary of State for record within thirty days from the date of the execution thereof the same shall become invalid and of no effect."

"This language, he said, was explicit, but he should not decide at this stage of the cause that it admitted of no interpretation except that which would be fatal to the complainants' suit. The construction contended for on their behalf was that the omission to file it did not destroy its validity, as far as the companies were concerned, but it affected it only so far as other parties might be prejudiced by the omission. This construction ought not, he said, to be adopted as a basis for preliminary injunction. Such a construction had never been put upon the act by any court of law, and was at best a doubtful one. The general rule is against a preliminary injunction, where the party asking it depends upon a doubtful question of law."

"If the agreement should be decreed at the final hearing to be valid the dividends now proposed to be paid would be taken into the account in adjusting a settlement between the two sets of stockholders. This could easily be done. The failure to comply with the law was the fault of the complainants as well as the fault of the defendants. Both were in laches. Had the contract been filed the complainants, under the aspects of the case as otherwise presented, would have been entitled to an injunction. The controverted and doubtful point on which their present application depends arises from their own default."

This hardly justifies the statement made by the President of the Central that "by the decision of the Court the companies may now be considered restored to their original position of independence." Mr. Johnston says that the re-execution of the contract will be submitted to the stockholders of the Central again, "but, as it is exceedingly unpopular, it is probable that the vote will be overwhelmingly against it."

An official circular of this company to the stockholders gives the gross traffic from January 1 to October 1, 1872, at \$5,339,000 (part of the last month being estimated), the expenses in the same period \$3,168,000, and the net earnings \$2,171,000.

#### German Railroad Statistics.

A correspondent of the London *Railway News*, writing from Hamburg, Oct. 1, says:

"The annual volume of German railway statistics for the year 1870 has just appeared; it is a very elaborate work, going minutely into details, and being compiled by the Statistical Department of the Association of German Railways may be considered as perfectly correct in every particular. That Association at the end of 1870 comprised 15 State railways, 5 belonging to private companies leased to and worked by the Government officials, and 31 private companies who managed their own affairs—making 51 railways in Germany. Besides these there were 24 Austrian and 5 of other States, giving an aggregate of 80 railways, with a total mileage of 3,953 German miles [about 18,500 English miles]. Their rolling-stock at the end of the year consisted of 7,732 locomotives, 15,066 passenger carriages, with sitting accommodation for 664,213 persons, 3,464 luggage vans, and 181,254 wagons capable of loading 30,349,255 centners of goods and minerals. During the year they conveyed 144,465,912 passengers, against 134,098,825 in 1869, showing an increase of 10,370,087 persons, or 7½ per cent., and the goods traffic was 1,962,323,743 centners, against 1,895,380,168 in the previous year, being an excess of 66,943,575 centners, or 3½ per cent. in favor of 1870. Sixty-two railways carried more passengers than they did in 1869, the increase ranging from 1 to 64 per cent. The largest excess was on the Siebenburgen Railway (64 per cent.); the greatest in Hungary, the Mohacs & Fünfkirchen (59½ per cent.); in Bohemia, the Buschtrader (57 per cent.); in Austria, the Galician Carl Ludwig Railway (56 per cent.); and in Germany, the Lower Silesian Branch (55½ per cent.), and the Hessian Northern (42 per cent.). Eighteen showed a falling off, the greatest defalcation being the Altona & Kiel (22½ per cent.), and the least was on the Berlin & Görilitz (less than 1 per cent.). The proportion of the different classes of passengers conveyed was: First class, 1·34 per cent.; second class, 14·23 per cent.; third class, 56·23 per cent.; fourth class, 14·23 per cent., and soldiers, 13·75 per cent. With regard to the goods traffic, 57 railways had an excess over the previous year, varying between 51 and 0·42 per cent., while 23 had a falling off of from 34 to 1·59 per cent. The largest increase was on the Transylvanian (Siebenburgen), which shows a plus of 51·19 per cent.; in Bohemia, the largest was the Bohemian Northern, with 39·81 per cent.; in Austria, the South Eastern State Railway, with 8·58 per cent.; in Hungary, the Fünfkirchen & Barcs, with 34·22 per cent., and in Germany, the Starigard & Posen, with 21 per cent. The smallest increase of all was on the Kaiser Ferdinand Northern Railway, 0·42 per cent. Of the 23 railways that showed a falling off, the largest was on the Saarbrück (17 per cent.), the Lobau & Zittau (also 17 per cent.), the Kirchheim (15 per cent.), and the Breslau & Glogau with 11 per cent. The lowest was the Main & Neckar, with 0·80 per cent."

The small proportion of first-class travelers—only four out of every three hundred—strikes an American railroad man.

#### Great Western & Canada.

The company asks tenders for 3,000 old iron T rails, to be delivered at Hamilton or Suspension Bridge at the rate of 100 tons weekly, and at the same rate at Windsor or Sarnia. Bidders must give the price per ton, gold or currency, place of delivery, and hand in their bids to the Treasurer by the 7th of November.